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# MODEL AIRPLANE

THE WORLD'S PREMIER R/C MODELING MAGAZINE

# NEWS

September 1991

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Aircore Trainer .40*

*Want Greater Positive Control?—  
CABLE LINKAGE HOW-TO*



*Midwest  
MUSTANG*

# TOP GUN

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# MODEL AIRPLANE NEWS

THE WORLD'S PREMIER R/C MODELING MAGAZINE

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# EDITORIAL

by TOM ATWOOD

**M**ODEL AIRPLANE NEWS and Pacer Technology—with the help of many supporting sponsors—joined forces to make the third Top Gun Scale Invitational the most successful Top Gun yet. We've committed several pages in this issue to bring you a broad picture of many of the magnificently crafted scale models that participated.



*Editor Tom Atwood (right) interviews Chief Judge Kent Walters (left) at Top Gun '91.*

As an aeromodeling magazine that has been published for over 60 years, we're deeply committed to finding ways to expand the hobby. One of the questions we ask ourselves is how we can convey the benefits of aeromodeling to ever greater numbers of people outside the hobby. By doing so, we could promote growth in the industry, and that would benefit all participants.

By promoting Top Gun, we're striving to bring wide attention to the achievements of modelers. A variety of magazines and local TV stations were at this year's meet, and we're hopeful that this coverage will expand at future Top Guns. Certainly, the exhibition and flying of scale model aircraft is potentially of wide popular interest. Because the models are scale, they're readily understood by non-modelers. The sites chosen for Top Gun are meant to dispel the stereotyped views of some non-modelers that the hobby is a less-than-serious endeavor! This is just one part of a multifaceted effort we're making to encourage growth in aeromodeling.

We have some suggestions for those of you who send pictures in to "Pilots Projects." We've received many photographs that aren't publishable because of simple oversights by the very modelers who took the extra trouble to send us a picture! When taking a photo, try to get the entire plane in it (or it will probably be skipped over). If possible, photograph the plane on a clean, hard surface; three-quarter views from ground level can often give the plane a more full-scale look, if that's what you'd like to achieve. Also, don't forget to include details of your plane's weight, wingspan, engine, propeller and kit manufacturer (or an indication it was scratch-built or "bashed" from a kit).

Any airplane designers receiving this magazine early: if you haven't sent in your entry to the Second Great American Design Contest, the deadline is August 1!

# MODEL AIRPLANE NEWS

THE WORLD'S PREMIER R/C MODELING MAGAZINE

NEWS

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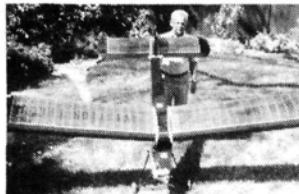
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# AIRWAVES

WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Airwaves," *Model Airplane News*, 251 Danbury Rd., Wilton, CT 06897. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the writer's identity can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

## ERRATA—July issue

- We incorrectly cited the U.S. distributor for the Yoshioka Liberty .45. It's distributed by Hobby Dynamics Distributors, P.O. Box 3726, Champaign, IL 61826.
- Brian Riddell took the photos of the Schluter Twin Star built by John Bona.



## A LIFETIME READER

Here's a photo of the KG-2 that I've just finished. Haven't flown it yet (the weather hasn't been right), but by the time you receive this letter, I will have. (I sent for the *Model Airplane News* plans in about February.)

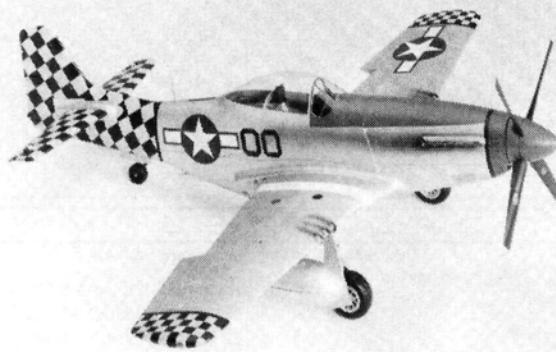
I thought readers may be

interested to know a little history regarding an old-time builder. I'm 75 years old and have been building models since I was about nine. I grew up with *Model Airplane News*. I've built them all—from the early '30s onward—and I'm still building. Of course, my start was with regular rubber power, and I moved on to Wakefield, twin pushers, gliders, microfilm indoor, free flight, gas, etc., up to the present 1/4 scale, etc.

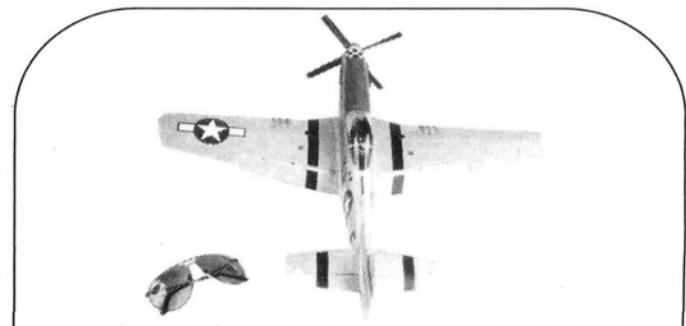
Along with the famous aviators of the early pioneering days was the inspiration, support and information that the magazine provided to all the modelers throughout the hobby world. This letter is nostalgic, but I think that every little bit of history that contributed to such an inspiring hobby should be remembered.

FREDERICK A.  
CATANIA  
*Rancho Cordova, CA*

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Frederick, we appreciate your letter. We'd like nothing more than to help rekindle the widespread enthusiasm for model aviation that was shared by so many—young and old—in the pioneering days of flight, and I think we have reason to be optimistic. Though the "Golden Age" of aviation won't be reborn, there's a new vista of R/C aeromodeling on the horizon, and there's every reason to involve the younger generation as they once were—through the pages of this magazine.

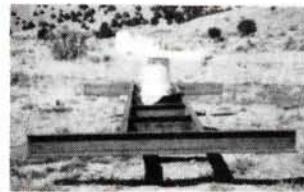
Some may be asking: what is this new vista? In addition to all the great subjects for

aeromodeling now actively being pursued, new propulsion technologies and new designs will flourish. Can anyone doubt that the kids of the next millennium will have inexpensive, "safe," flying toys to play with? or that this and the inevitable exploration of outer space (gradual though it may be) will contribute to making generations to come enthusiastic about the possibilities of full-scale and R/C flight? Part of the growth in interest will result from the incorporation of aero-modelling into middle and high school programs—something we're encouraging. Doubters should stay tuned,

as Model Airplane News will be hot on the trail of the new technologies.

By the way, your KG looks great! Let us know how it flies! Any readers want to see more designs from the early days of Model Airplane News?

TA

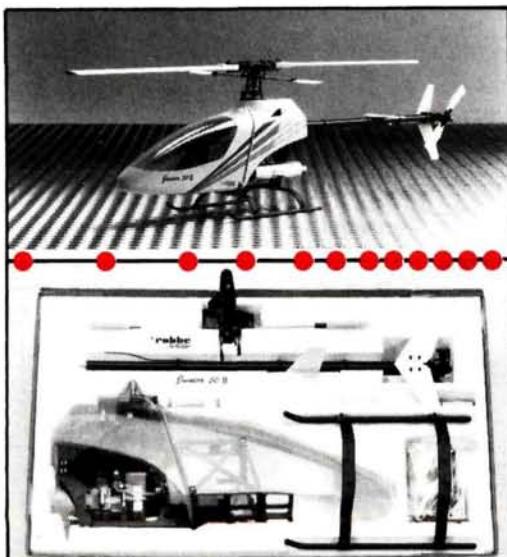


pivots. This frame will support an 8x12-foot building that will be dedicated to tracking and controlling model aircraft so that altitude attempts can be made regularly—weather permitting. I hope that model aviation history will be made here in the near future.

If successful, and I'm sure that it will be, the most important thing to remember is that it almost didn't happen. I tried to learn how to fly

(Continued on page 10)

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# AIRWAVES

(Continued from page 9)

R/C by using a Telemaster 66. Although the 66 is a good plane, it had one of the world's worst pilots at the controls, and it had a bad ratio of flight time to repair time.

I decided to build a plane that was similar to a free-flight and could withstand landings among the sagebrush and boulders. I learned to fly with my first plane, and four models later, I had a plane—the Strangeling Bush Trainer—that was easy to fly and could be repaired at the field. I wonder how many others who might have had something to contribute to aviation were turned off by so-called trainers?

I see you're having your Second Great R/C Design Contest. I'd like to see a separate design contest for trainers. The judges should be people who don't know how to fly.

If you know of anyone who'd be interested in attempting to set an altitude record with his plane, please let me know.

STEPHEN McCRARY  
Datil, NM

*Stephen, your radar-tracking system is intriguing, and we'll forward any inquiries about the altitude attempt. Your difficulty with the Telemaster makes me wonder whether you learned to fly "on your own," i.e., without the benefit of a local club. That's always the toughest route, and for this reason, we encourage newcomers to look for a club that has R/C pilots who are willing to serve as trainers. However, I'd like some additional pictures of your perfected desert trainer—maybe this is just the ticket for others who are similarly situated. It sounds as if it would make a great construction article. Thanks for writing, and keep us posted! TA*

## PULL-OUT PLANS PRAISE!

Yesterday I received my July, 1991

issue; it contained the pull-out plans for the Bee-Tween. I like it and am on my way to my neighborhood hobby shop to get the materials. This pull-out plan is a very good idea; as a scratch-builder, I appreciate it.

I'm 66 years old and a recent returnee to the hobby after an absence of 40 years. I have to catch up, so I greatly appreciate informative articles like "Building Secrets"—give us more!

JIM BECK  
Shreveport, LA

Congratulations on the July, '91 issue of *Model Airplane News*. This has to be the best ever!—super color picture of the Eindecker on the cover, but best of all is the pull-out plan. This reminds me of the old *Model Airplane News* magazines that we used to wait for every month to see which new plans were in it.

Congratulations to Randy Randolph! The Bee-Tween has to be the prettiest model ever. Do you know that you gave me a \$6 plan (at least) for spending \$3 on a magazine? Wishing you straight cuts and strong glue joints.

JOHN VALLS  
Laredo, TX

Just a note to let you know how pleased I was to find a pull-out plan in the July issue of your fine magazine. As an old-time model builder (AMA 15011), I enjoy looking at full-size building plans for construction features and ideas. For years, I've subscribed to the British "Radio Modeler" and the German "Flug" magazines, primarily because of their pull-out plans. There was always talk of American magazines including plans, but it never happened.

I'll look forward to more plans for 049- to 074-size R/C models. The lack of flying fields and the dangers of larger models make it imperative

# duke's mixture



This column was started many years ago to help you, the modeler, with problems and to give advice. We plan to continue it in that tradition, and dedicate it to the memory of Duke Fox.

that modelers look to smaller models.

MATTHEW FICNER  
Niagara Falls, NY

Yes, I like the full-size plan! The British magazines have been doing this for years, and I think it's an excellent idea. This issue was one of the best you've produced in a while because there's more emphasis on building models and less on ARFs. Keep up the good work.

RAYMOND LEFRANCOIS  
Stafford, VA

*Jim, John, Matthew, and Raymond: thanks for letting us know that you want to see more pull-out plans; we plan to offer more! Jim, we're planning more articles on "building secrets" as well. Raymond, we'll emphasize building methods, but we have to include ARFs, too, since they're part of the hobby. The challenge is to strike a balance without losing sight of the fundamentals, and we're trying to meet that challenge. We appreciate your taking the time to write. It's important to hear from everyone so that we can serve our readers better. So, to all our readers: don't hesitate to let us know what you want more (or less!) of.*

TA

*R/C flight-training program; we hope you'll find it useful. I'm also encouraging school teachers who are already teaching aeromodeling to write to me. Seeing how it has successfully been done will help jump-start aeromodeling programs in schools elsewhere. Although Model Airplane News can't provide free publications to every school that writes to us, I'll be happy to provide you with outlines of the successful programs of which I'm aware. You can also look forward to an article on one or more great programs in future issues. We wish you all success!*

TA

## TWILIGHT TWISTER

In the July issue, Jim Bomer of Delta, OH, asked about an OT model of the Knight Twister. The construction article and plans appeared in the November '41 issue of "Air Trails." I have the magazine and the full-size plans, which have been transferred to drafting film. I'd be happy to share them with Jim or any other modeler who would like to build this beautiful plane. I'm still planning to build it, but tend to put things off!

DR. GLENN W. JACKSON  
Alliance, OH

## COURSE IN SOARING?

As a parent and a school volunteer, I'd like your help in getting an aeromodeling class going at our school. (I've been building planes since 1940.) Students are interested in C/L building and flying; there are also those who want to start R/C. If you could help me get started with a course in aeromodeling, it sure would be a help.

RICHARD FISHER  
Cleveland, OH

*Richard, in an upcoming issue, we'll publish an article on a successful*

*Glenn, thanks for the kind offer. If Jim or any other modelers contact us about it, we'll forward their letters to you. Many wonderful OT designs could be resurrected if only their plans could be found. Larry Andersen (Yuma, AZ) wrote to tell us how much he enjoys flying the Knight Twister. His full-size plans came from Gleason Enterprises, 1106 10th Dr. SE, Austin, MN 55912. Telephone: (507) 437-3781.*

GY

(Continued on page 119)

## UPDATED CARBURETOR INSTRUCTIONS FOR FOX ENGINES

**All carburetors on Fox engines have been pre-set at the factory!**

The proper procedure to set the Fox carburetor is to follow these simple guidelines:

Loosen the needles out of the friction clips until there is no drag as you turn the needles. Then turn the needles in until they start to engage the drag on the clips. After you feel the needles start to click, turn them in the number of turns as listed in the chart below:

### 19 - 25 Carb Setting

Low Speed - 4 Turns  
High Speed - 5 Turns

### 36 - 40 Carb Setting

Low Speed - 4 Turns  
High Speed - 6 1/2 Turns

### 45 - 50 Carb Setting &

**60 - 74 & Quickee Carb Setting**  
Low Speed - 2 Turns  
High Speed - 5 Turns

This will result in a rich setting, but should allow the motor to be started. From these settings, 1 or 2 clicks at a time should be all that is needed to lean the motor in.

The motor should be run **rich**, not lean, and you should use fuel with a minimum of 17% all **castor oil**, not synthetic oil or blends. Adding castor oil to your fuel is permissible to achieve the proper mixture.

To properly adjust the motor from these settings, open the speed up to full throttle, lean the high speed needle for maximum R.P.M., and then richen 1/3 turn. To set the mid-range and low speed side, let the motor slow to an idle and lean the low speed needle until maximum R.P.M. is reached, then richen 1/3 turn.

After this is done, throttle up slowly. If you find it to be lean in the mid-range, then richen the low speed needle a click or two. The low speed needle controls the mixture from idle to 7/8 throttle. If adjustments are made correctly, then the final adjustment on the high speed needle for different temperatures and humidity levels will take care of all adjustments.

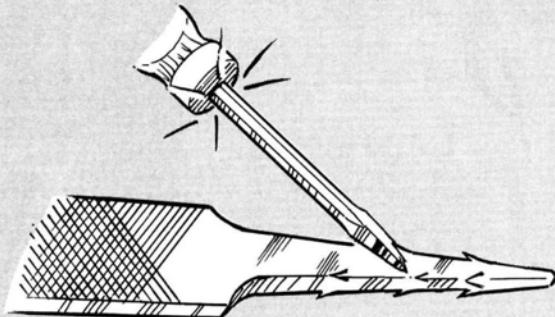


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# HINTS & KINKS

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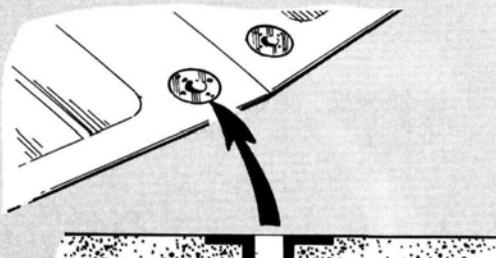
by JIM NEWMAN



## FILE SAFETY

If the handle comes off a file while you're using it, it could stab your hand. To keep file handles firmly in place, use a cold-steel chisel to make a series of small barbs along the soft edges of the file's tang.

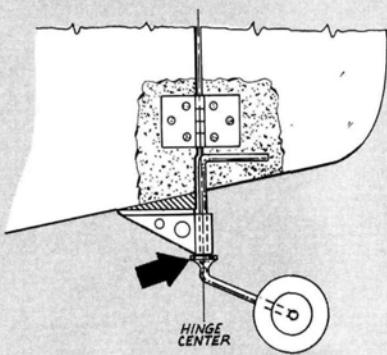
Gene Chase, Oshkosh, WI



## WING-BOLT WASHERS

If you have plenty of spare servo wheels, recess two into the top of a wing, then drill them to take the wing bolts. They'll act as washers and will spread the pressure of the bolt heads.

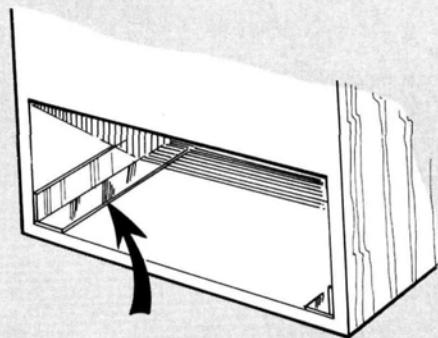
Narendra Java, Sharjah, United Arab Emirates



## TAIL-WHEEL LEG GEOMETRY

Some designers don't appreciate that the pivotal center of the tail-wheel leg must be axial with the pivotal center of the rudder hinges. If the centers aren't aligned, the rudder hinges will bind severely because of "toggle action," and they'll eventually fail. If your tail-wheel bracket isn't aligned with the hinges, glue in a wedge (shown shaded). You must also solder a thrust washer (arrowed) to the leg (the washer bears against the bracket). If you don't, all impact stress will be transferred to the hinges, which will shear and fail catastrophically.

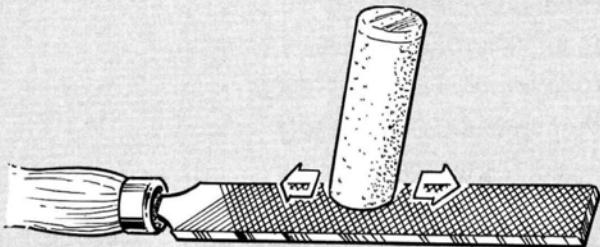
Ron Ogren, Orchard Park, NY



## EASY SLIDER!

When you build a flight box, glue narrow strips of Formica® into the corners, as shown. The drawers will then slide smoothly. If you have no Formica®, use pieces of the polypropylene strapping that's used to bundle newspapers.

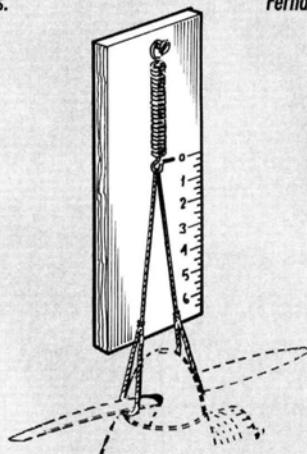
Roger Diluigi, Homewood, IL



## STOP FILE CLOGGING

Here's another tip for using files! Before filing soft metals like aluminum and brass, rub chalk over the file. The chalk will prevent the soft metal filings from clogging the teeth, but it won't impair their cutting action. Jumbo chalk sticks are available from office-supply stores.

Fernando Torres, Lima, Peru



## POOR MAN'S SCALE

Nail a suitable spring to a piece of wood, and bend one end of the spring so that it forms a pointer. Extension is proportional to load (Hooke's Law), so if you hang a 1-pound weight on the spring, it will stretch a certain number of inches. Make simple calibration marks on the wood. Verify the accuracy of your scale by weighing something and then checking it on your supermarket's government-inspected digital scale.

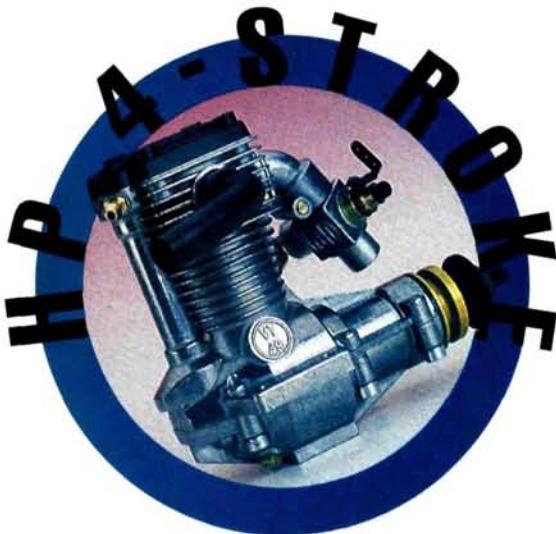
Fred Schmidt, Livonia, MI



# AIR SCOOP

by CHRIS CHIANELLI

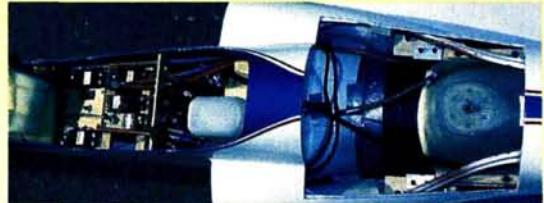
New products or people behind the scenes—my sources have been put on alert to get the scoop! In this column, you'll find news that will, at times, cause consternation, and telepathic insults will probably be launched in my general direction! But who cares?—it's you, the reader, who matters most! I spy for those who fly!



You heard about it here first! The reintroduction of the Austrian 2-stroke HP Gold Cup engines from RJL Enterprises of Sierra Madre, CA, has been met with such enthusiasm that the company has now decided to reactivate the line of HP 4-strokes—starting with the .49 VT. I don't know how many of the original line will be put back into action—the more, the better. The HP was sorely missed by engine lovers, and it's great to have these smooth-running powerplants at our disposal once again.

Here's fan expert John Whitmore, (Bridgeport, CT, Balsa Bugs) holding a Century Jet Sport Hawk. The Hawk and its Dynamax fan are powered by a K&B .82 with a Davis Diesel conversion. I've seen top-notch helicopter fliers run "dieselized" aerobatic helis, so I went to the Sherwood Island flying field (Westport, CT) to see what I think is the first "dieselized" tractor fan taking

## OH, THAT FULL-SCALE AROMA!



Note contra-piston adjuster where the glow plug should be.

to the sky. Not only did I see a very promising flight performance, but there was no hassle. Were my eyes deceiving me? The plane's vertical performance was on the money. Were my ears deceiving me? With a Soundmaster pipe, it was quiet. My nose gave me the real story: just like the big boys, this plane uses a kerosene-based fuel. It's the first time I've ever encountered a model that *smells* full scale. Maybe some people have been deceiving us with incorrect info on diesels.

## Scale Campaign

Hirobo has put a lot of R&D effort into scale helicopters, and these are just a few of the results. The new .32- to .46-powered Vertol, which was the first to be released, is almost 38 inches long and has 41-inch

rotors. The unique Vertol can be equipped with as many as three gyros; it requires a 5-channel radio; and it comes with U.S. Marines decals. The .60- to .80-size Tow Cobra has a new frame, and its mechanics are compatible with the SST series of helis. Details on the highly

realistic Cobra include a tow launcher, a gun sight, wipers and door handles. Last—but certainly not least in my book—is the .32- to .46-size Lama SA-351B, which utilizes a new, scale mainframe that's



VERTOL

coupled to a scale, tail-truss assembly. For total scale appeal, the Lama can be topped off with an optional three-blade rotor head. Watch



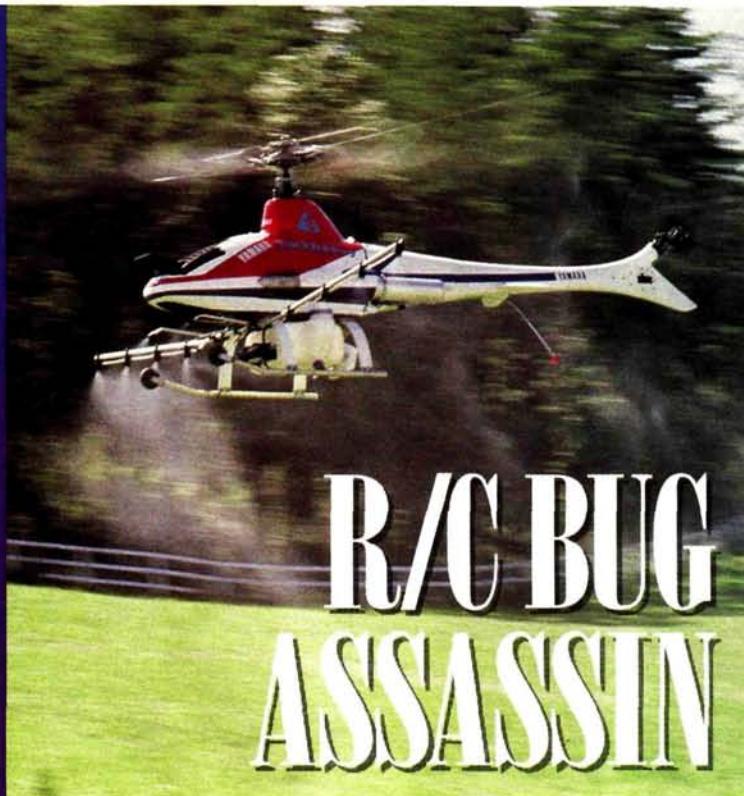
LAMA

out! The Hirobo Scale Series machines are designed for scale flight realism, not for aerobatics. Hirobo has still more scale surprises; keep watching "the Scoop"!



TOW COBRA

This Yamaha R-50 (it's distributed by Yamaha, but it's manufactured by Hirobo) is used for crop dusting on small Japanese farms. Powered by a 2-stroke Yamaha 98cc engine, the 96.8-pound R-50 is almost 12 feet long, and it has a main-rotor span of 9.8 feet. Crop dusting requires three operators: a pilot, a technical assistant and a wire operator who controls the flow of insecticide, which is pumped to the chopper through a hollow wire from a nearby truck. In addition to the crop-dusting gear, the R-50 can carry a payload of up to 44 pounds, so it's often equipped with an onboard spy camera. Using her multi-faceted influence, our beautiful spy in the Far East (code name Lingafoon) has just acquired one of these contraptions for "Air Scoop" spy shots. The R-50 isn't available in the U.S., but it should be.



## From a Distance

Although there's a comparable product on the market (very expensive in Japan, I'm told), this remote rpm sensor for helicopters is being developed by a private Japanese experimenter. It's rumored that he has industry backing. Who knows?—maybe this design will eventually make it to the States. If it works and it's priced reasonably, we hope it will.



This super-sleek Italian Sagittario is from Z-Models. It has a prefabricated epoxy fuselage with sheeted wings and a stab. Its pusher fan (it might be a Byron unit) is accessible, so it's easy to tune, and it has optimum induction, which should make it very efficient. I don't think this kit is available in the States yet; but many of us wish it were. It's possible that this design is more user friendly than most ducted fans, yet it still retains its jet appeal. Could this be the chef... I mean, jet of the future, Alice? Will it take you to the moon?!

## FUTURE FAN TRAINER?

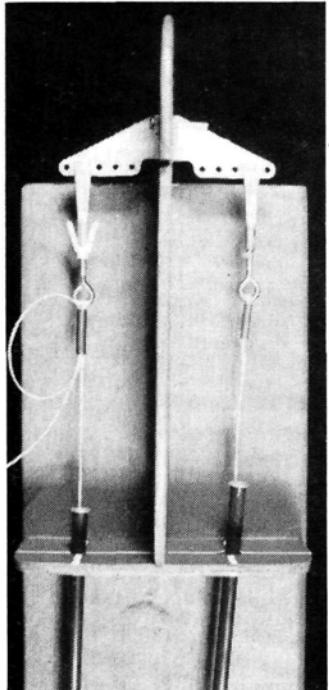


# Positive pullers

Good for models of any size

by H. DAN MOSER

**I**N THE LAST two years, I've installed pull/pull cable systems in over a dozen small sports trainers, old timers and kit planes, and I'm convinced

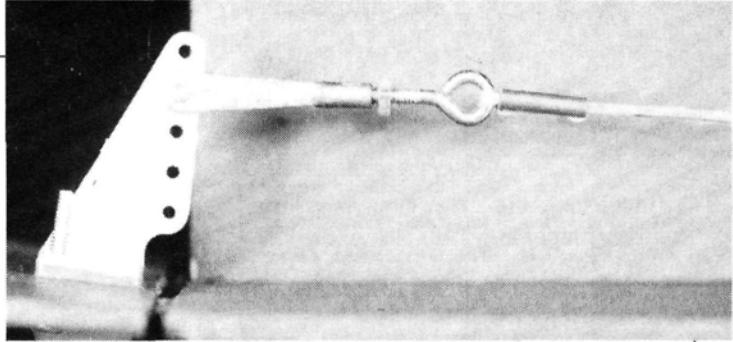


■ Above: two back-to-back nylon control horns are all that's needed. Make sure the horns' holes are lined up with the hinge line and that both clevises are equidistant from the hinge line. ■ Right: the wing nut, which is made out of a nylon clevis, makes it possible to make adjustments at the field without tools. Safety loops should be used at the servo ends and at the control-surface ends.

that this is the ideal elevator and rudder system for any R/C plane. Positive action, lightness, easy installation, the absence of radio interference, minimal friction with adjacent pushrods or formers and the absence of trim variations caused by temperature changes are some of the obvious advantages.

I've found that Sullivan's\* no. 521 Pull/Pull Assembly provides the most convenient assortment of pull/pull hardware. It includes plastic guide tubes, tube-end eyelets, soft-copper terminal sleeves, eyebolts, locknuts, Sullivan's Golden clevises and companion safety clips, and Kevlar cable. Other sources of pull/pull hardware include fishing-tackle shops and Proctor\* for the 1/4-scale builder.

To make the T-bar control horns on the control surfaces, mount two standard control horns back-to-back (one on each side of the surface) with no. 2 screws or 2-56 machine screws of the proper length. To eliminate geometric errors, the clevis holes should be on the hinge line and at an equal distance from the line. The effective ratio of control-surface movement



All the small components here are available in Sullivan's no. 521 package—very convenient. After the safety loop has been tightened, the copper terminal sleeve should be crimped at two or three points.

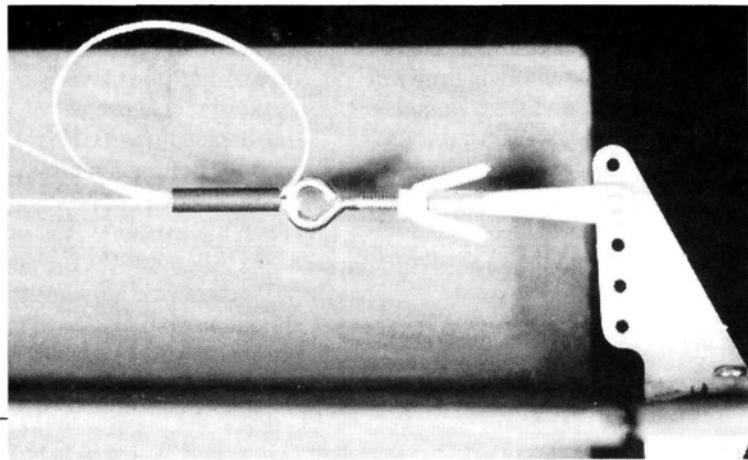
# Cable Linkage Systems

to servo rotation can be adjusted by selecting the clevis mounting holes at the servo and/or control horn.

Straight-line cables between the servo and the T-horn provide the ideal setup, though you can offset the cables through the guide tubes where necessary to avoid formers or other interference. To determine guide-tube routing, study the plane's top

and side views while it's under construction. By drawing straight lines on each view between the servo arm and the control horn, points of entry into the fuselage can be established. Light balsa sheeting should be installed in these areas to support the covering. To insert the guide tubes at the correct angle, drill angled holes with a long 3/16-inch drill bit. The top and side views will also establish the location of the guide-tube supports at a former near the servos. No other supports should be necessary in a straight-line installation.

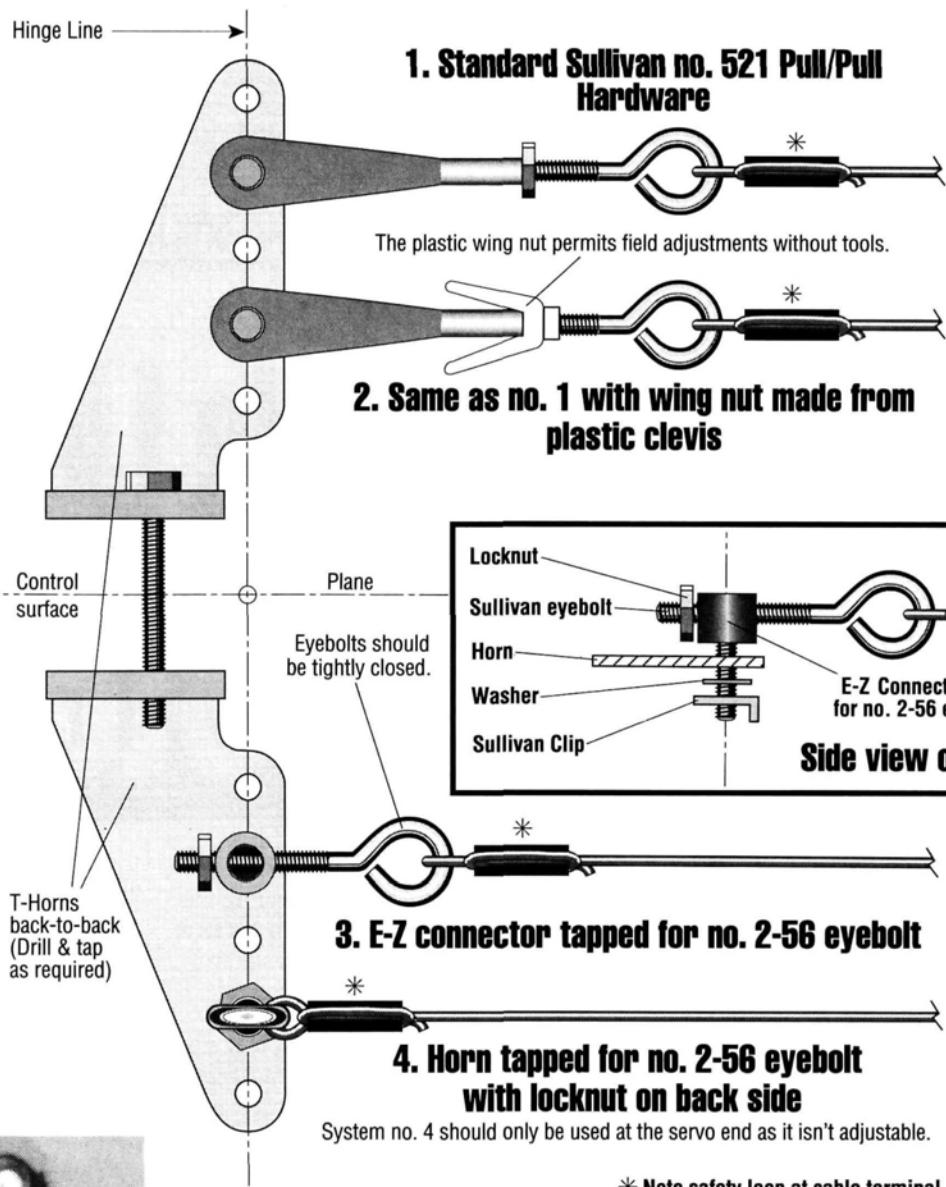
After installing the control horns, the servos and the guide tubes, the



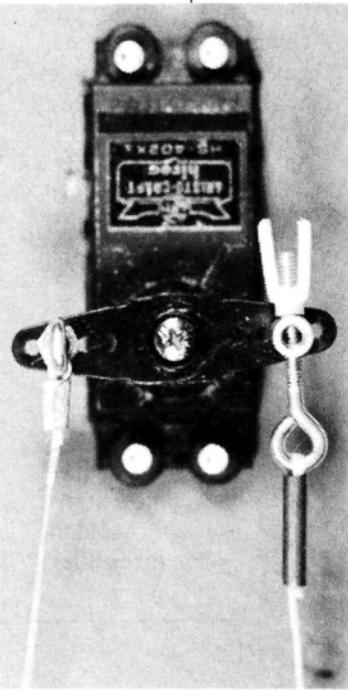
# Cable Linkage Systems

final location of guide supports can be verified by inserting a straight 0.040-inch wire through the guide tube from the T-horn to the servo. After the points of entry have been covered, install and permanently anchor the guide tubes.

Once you've assembled and covered the fuselage and control surfaces, you can start on the final installation of the cables. The cables are first connected to the servo arms with the clevis, the eyebolt and the locknut where space permits. Alternatives may be necessary in some



\* Note safety loop at cable terminal



situations. To eliminate the possibility of slippage, make safety loops in the cables at all the terminal fittings. When the assembly is firmly in place and the terminal fitting is against the eyebolt, the terminal sleeve should be crimped at two or three points.

Feed the cable through

**Using a Du-Bro\* EZ connector, the wing-nut adjusting method can be used at the servo end of the cable control system.**

the proper guide tube to its respective control horn, and connect it to the clevis eyebolt after centering the servo and the control surface. Adjust the clevises at the approximate center of the threaded portion on the eyebolt. Before you crimp the final terminal fitting, adjust the tension on the cable. Allowing  $\frac{1}{64}$  inch to  $\frac{1}{32}$  inch of free movement should prevent servo pre-loading and excessive battery drain. Make the

clevis) for the locknut, and this allows me to make field adjustments without using tools.

I'm convinced that after you install and fly your own planes with the pull/pull system, you'll never revert to the pushrod setup again.

\*Here are the addresses of the companies mentioned in this article:  
**Sullivan Products**, P.O. Box 5166, Baltimore, MD 21224.  
**Proctor Enterprises**, 25450 N.E. Eilers Rd., Aurora, OR 97002.  
**Du-Bro Products**, 480 Bonner Rd., Wauconda, IL 60084. ■

## Fitting pull/pull systems to small planes

# FIFTY YEARS AGO

## A STAR IS BORN!

by CHRIS CHIANELLI



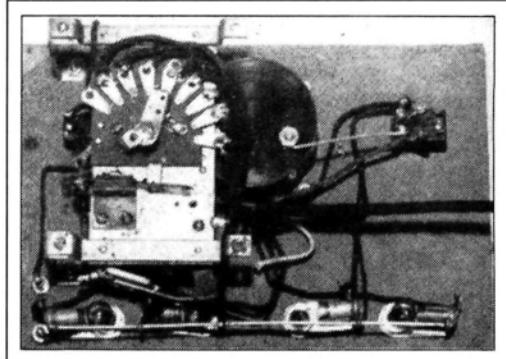
Although I'm sure there were those who knew the Mustang was destined for greatness, interest focused on its "classified" wing section with its famous laminar-flow airfoil. If you look at the scale drawing that appeared in the September '41 magazine, you'll note the words, "Airfoil not yet released by the War Department."

That month's really big news concerned the newly released Douglas B-19. The first line of the "News Flash" column read, "Biggest news of this or any other month"—the author was actually commenting on the hugeness of the B-19's 212-foot wingspan. Nevertheless, newspapers across the country gave a lot of space to an airplane that boasted a production run of one! During this time of incredible aviation advances, every new plane was given great attention in U.S. magazines—especially mags like *Model Airplane News*.

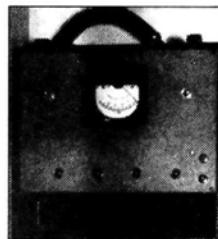
**T**HE PLANE SHOWN on the September '41 cover may need less introduction than any other airplane ever made. It has become an icon of American aviation that even those who aren't aviation enthusiasts correctly identify as the venerable Mustang, or P-51. Some fighters, like the P-47 or the Corsair, almost look as though they're wearing spiked bulldog collars, but the deadly Mustang has gracefully fluid lines that give it an air of benevolence. But how was the Mustang greeted in '41, in the prototype XP-51 days?



**R/C FORGES AHEAD!** **T**ough not moving at the feverish pace of full-scale fighter-plane development, the R/C model airplane hobby was also advancing. The first line in the column called "Remote Radio Control" reads, "AA Flight calling Dayton...calling Dayton...come in, please." The column's description of the radio's functions reads: "A radio



Front and rear views of the electric conjulator. Note stepping relay made from pinball machine relay.



signal is radiated into the ether by a radio transmitter on the ground. A sensitive receiver in the plane intercepts this signal and converts it from electrical to mechanical energy." Does this sound familiar? A series of on/off pulses controlled the plane in a variety of ways, depending on the number in the series, e.g., three pulses activated one control, while four activated another one. The device was called a "conjulator." A push-button or telegraph key could be used to input the desired numbers, and telephone dials were under consideration because they could transmit the series of pulses—and, therefore, the control command—more quickly. The system was crude, but these pioneers were obviously on the right track.

While inventors on the frontiers of radio development were kept busy and fighter designers were well on their way to cutting up the Luftwaffe, advertising genius in the modeling industry was also in evidence. An ad for the Megow Super Quaker free-fighter showed the smiling faces of 14 pretty women who "love a winner." Would flying a winner—in this case, a Megow—really ensure popularity with women? I doubt that anyone was convinced!



*All the Girls  
Love a Winner!*

With rapidly developing aviation, advertising and R/C, 1941 must have been a fascinating time in which to live. ■



# PILLOT PROJECTS

## A LOOK AT WHAT OUR READERS ARE DOING!

### SEND IN YOUR SNAPSHOTS!

*MAN* is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable.

All photos used in this section will be eligible for a grand prize of \$500, to be awarded at the end of 1991. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in!

Send those pictures to:  
Pilot Projects, Model Airplane News, 251  
Danbury Rd., Wilton, CT 06897.

### ■ SKYCAM

Technical Sgt. Revell Walker built this big video-camera-carrying spy plane that he calls the "VH-1 Vidstick." It has a 108-inch wingspan and Revell has upgraded its power to an ASP 1.08 (its previous .60 wasn't powerful enough). Revell flies with his pilot buddies (like Mrs. Kanai, who's shown in the photo) at the Kanto Moderaires R/C Club near Yokota Air Force Base where he's stationed.



### ■ WISCONSIN AIR SHOW

Ken Bell of Fontana, WI, modified a Davey Systems kit to resemble a local stunt plane. Ken added the headrest, the cowl and wheel pants, and he omitted the front cockpit. Ken, we bet your 5½-pound, Fox .50-powered show biplane looks beautiful flying in the clear, dairy-country skies!



### ■ 48 YEARS AGO

George Penniket of Nelson, British Columbia, Canada, took this photo of his interesting scratch-built Fairchild Cornell (PT-26) in front of the WW II Royal Canadian Air Force Base at Vulcan, Alberta. That's



where George learned to fly in the original full-scale PT-26. Whether it's Ranger powered or O.S. .30 powered is beside the point: 48 years later, George still flies the FH660 off the same strip of runway.



trees. Norman states that "the purist would throw up his arms in disgust, but...I built it for my style of enjoyment!" Norm, you're our kind of R/C iconoclast!

### ■ BEST OF THE OLD AND NEW

Sixty-seven-year-old Norman R. Anderson from Newport, RI, claims that his scratch-built Miss America has given him his second childhood. Norman writes that it's a pleasure to fly and that it reminds him of the old free-flight days. Norman covered his 7-foot-span Miss America with Super MonoKote, beefed up the wing, and added a wing dowel and nylon bolts. He installed a Saito .50 Golden Knight 4-stroke and, of course, added radio guidance so that he can avoid those pesky stone walls and



### ■ COSMOBAT

Axel Maurer and Stephan Dürrstein of Mühlheim, Germany, built this beautiful starship version of the Extra 260, and then they did a perfect job of photographing it. This 28-pound, 95-inch-wingspan "Schwarzen Blitz" (Black Lightning) 260 is powered by a Zenoah 62. The plane, which was finished with Mercedes Benz metallic paint #199, has onboard electric starting, a high-performance smoke generator and a fuselage-integrated "reso-muffler" (gentlemen, please give us more details on that one!). The model is designed for "synchronous acrobatic show-flight." A truly masterful job, Herrs Maurer and Dürrstein!

### ■ MOSQUIT-IST

H.L. Waters of Stratford, OK, used a Pica Duelist 240 kit to make his creation. H.L. converted the Pica kit to a tail-dragger and made what he calls "other evident changes" to create the illusion of the famous English Mosquito night fighter/bomber. It goes to show ya: it doesn't have to be true to scale (or even remotely close) to be lots of fun at the field. It also goes to show that *any* time is a good time for the Raid.

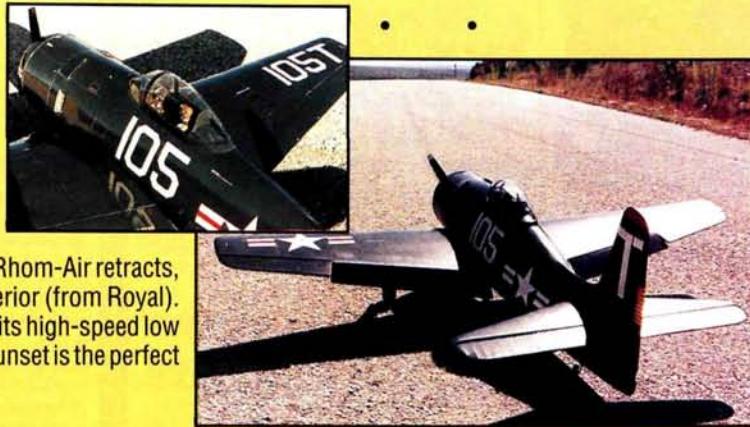


### ■ SPIFFY SPORTSTER

Johnny Hostetler, of Flower Mound, TX, proudly poses with "Born in the USA"—a modified Great Planes Super Sportster built by his dad, Bruce. Bruce moved the canopy aft and added an access hatch (a convenience too many kit manufacturers have neglected). We think the modified Sportster is reminiscent of a Brown B-2 racer. Bruce's friends who fly full-scale planes tell him that with its YS 1.20 and its three-blade Graupner 11x7 prop, his plane sounds like a Rolls Royce Merlin overhead; Bruce tells them it's the prop tips going supersonic!

### ■ RIVET REGALIA

Paul Snowden of Dripping Springs, TX, sent us this picture of his F8F Bearcat, which was built from a Royal kit. Paul writes, "I can't say enough about the quality of that kit. It was a pleasure to build." The 11-pound plane sports Robart struts, Rhom-Air retracts, inner and outer gear doors and a fully detailed interior (from Royal). Paul says it flies as if it weighed 7 pounds and that its high-speed low passes are "hair-raising." Paul, we think a Texas sunset is the perfect lighting for your Royal 'Cat.



**G**ERTRUDE STEIN ONCE said, "A rose is a rose is a rose." Had Ms. Stein been a R/C modeler, she might have written: "A sport model is a sport model is a sport model," be-

cause, with some exceptions, sport models look alike, fly alike and are pretty much like

*The Fairhope Flier is held securely by the author's daughter Donna.*

peas in a pod. The Fairhope Flier, which is a sport model, is one of the exceptions:

it looks different; it handles differently (on the ground and in the air), its airfoil is different and—perhaps, best of all—it flies like a dream come true. Yes, it's a sport flier. Yes,

*Below: Fairhope Fliers stand at attention! The plane has become a local favorite—as you can see by the number here!*



## CONSTRUCTION



*Nick Neville flies the author's plane. He regularly makes it do the impossible. You name it; Nick and the Fairhope Flier can do it.*

# FAIRHOPE FLIER

Amazing Aerial Contortionist



by BILL HAYWOOD

# FAIRHOPE FLIER

**"This aircraft's performance is so outstanding that almost everyone will stop and watch..."**

almost anyone who's proficient with trainers will enjoy flying it; but that's where the Fairhope Flier parts company with other sport models.

This aircraft's performance is so outstanding that almost everyone will stop and watch, open-mouthed, the first time they see it flying. Its gentle handling characteristics, its grand vertical performance, its outstanding ability to grab a thermal and soar, its aerobatic flexibility and its tremendously wide speed envelope are enough to catch the eye, as well as the imagination, of any modeler.

I've flown it successfully with a sick .40, a snarling .50, a sport .60 and a screaming .61 with a pipe. Add the big roomy radio compartment and very easy construction, and you can see why I'm so enthusiastic about building and flying the Fairhope Flier.

How did this model come into being? About a year ago, my friend and flying buddy Nick Neville (an ardent fun-fly contestant) made a list of the things a model should do to be a winner, then he built what he considered to be a state-of-the-art flying machine—Fairhope Flier.

Nick is one of the most expert fliers I've ever seen; the many trophies in his shop include a first-place pattern trophy, which he won at the AMA Nationals. Few modelers can watch Nick's outstanding performances with the Fairhope Flier without wishing they owned such an aircraft, and my friend Dick Ashman and I couldn't resist. A week or so after we first saw it, we went to Nick's home with drawing tools and paper. A couple of hours later, we had a set of plans ready for reproduction.

Our planes are slightly different from Nick's, but all the

## SPECIFICATIONS

Type: Sport plane  
Wingspan: 56 inches  
Weight: 5 pounds  
Wing Area: 689 square inches  
Wing Loading: 16.7 ounces per square foot

Power Req'd: .40 to .60  
2-stroke engine

No. of Channels Req'd: 4  
(aileron, elevator, rudder, throttle)

Features: the shoulder-wing Fairhope Flier has a built-up construction and a semisymmetrical airfoil.

Comments: designed for all-around aerobatic sport flying, this agile flier offers gentle handling with a wide speed envelope. For increased speed and roll rate, "hot" fun-fly pilots can omit a 3-inch rib bay at each wing tip.

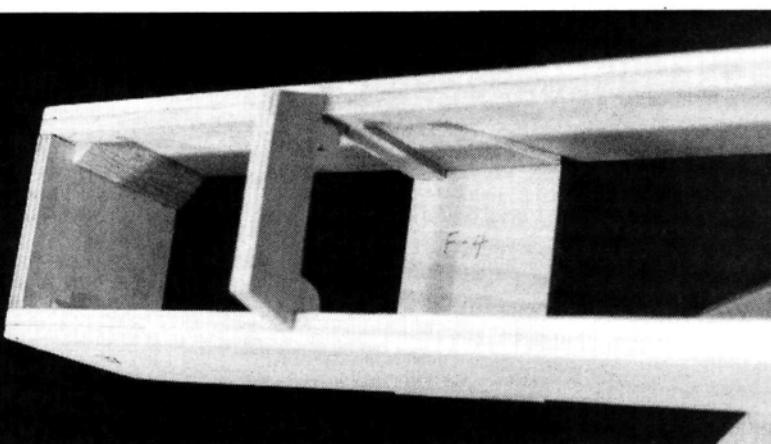
modifications are minor. Nick modified his second one, and each slight change increased the Fairhope's versatility and improved its flight characteristics. The clipped-wing version is an example of this. If you're an experienced flier and enjoy flying "hot" ships, shorten the wing shown in the plans by leaving a 3-inch rib bay off each wing tip. With this shorter wing, speed and roll rate are increased.

Nick and I drew the final set of plans presented here. They were then very skillfully and artistically rearranged and traced by Jerry Bates, who's a well-known modeler in scale

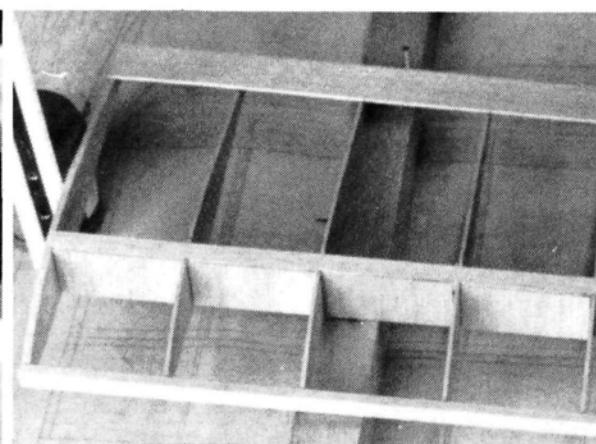
circles. Jerry also made some changes and prepared the bill of materials. If you've built a couple of kits, you should have no trouble completing this model.

## CONSTRUCTION

A bill of materials is shown on the plan. Before starting construction, gather all the materials, then make templates of the ribs, the bulkheads, etc. Cut out all the parts and set them aside. Use medium-hard or hard aileron stock to prevent aileron flutter. When you build the tail assembly,



Here, landing-gear block F 4, side blocks F 3 and strengthening blocks have been installed. Note the triangle blocks that strengthen the firewall (F 2).



Dihedral angle is set by using a ruler and a straight block. Note how 1/16-inch sheet has been glued between the top and bottom spars to avoid having gaps, which weaken a structure.

# FAIRHOPE FLIER

you'll have to choose between built-up surfaces and solid balsa. (Both are shown on the plans.) I prefer built-up surfaces because they seem to be lighter, stronger and less likely to warp. The landing gear should be of high-quality, tempered aluminum that's able to withstand a lot of abuse. It's a big gear, but it makes ground handling easier.

• **The wing** should be built first! (The reason will become apparent later.) Spread out the plan on your building board, and cover the left wing panel with waxed paper. Pin the bottom wing spar to the plan, then the trailing edge. With the exception of the  $\frac{1}{4}$ -inch center rib, glue the ribs into place. (Use a 90-degree triangle to keep them vertical.)

Install the top spar. Pin a piece of  $\frac{3}{8}$ -inch square balsa to the plans over the leading edge. Place the  $\frac{1}{4} \times \frac{5}{8}$ -inch leading edge on top of this, making sure that it extends at least  $\frac{1}{16}$  inch above and below the leading edge of each

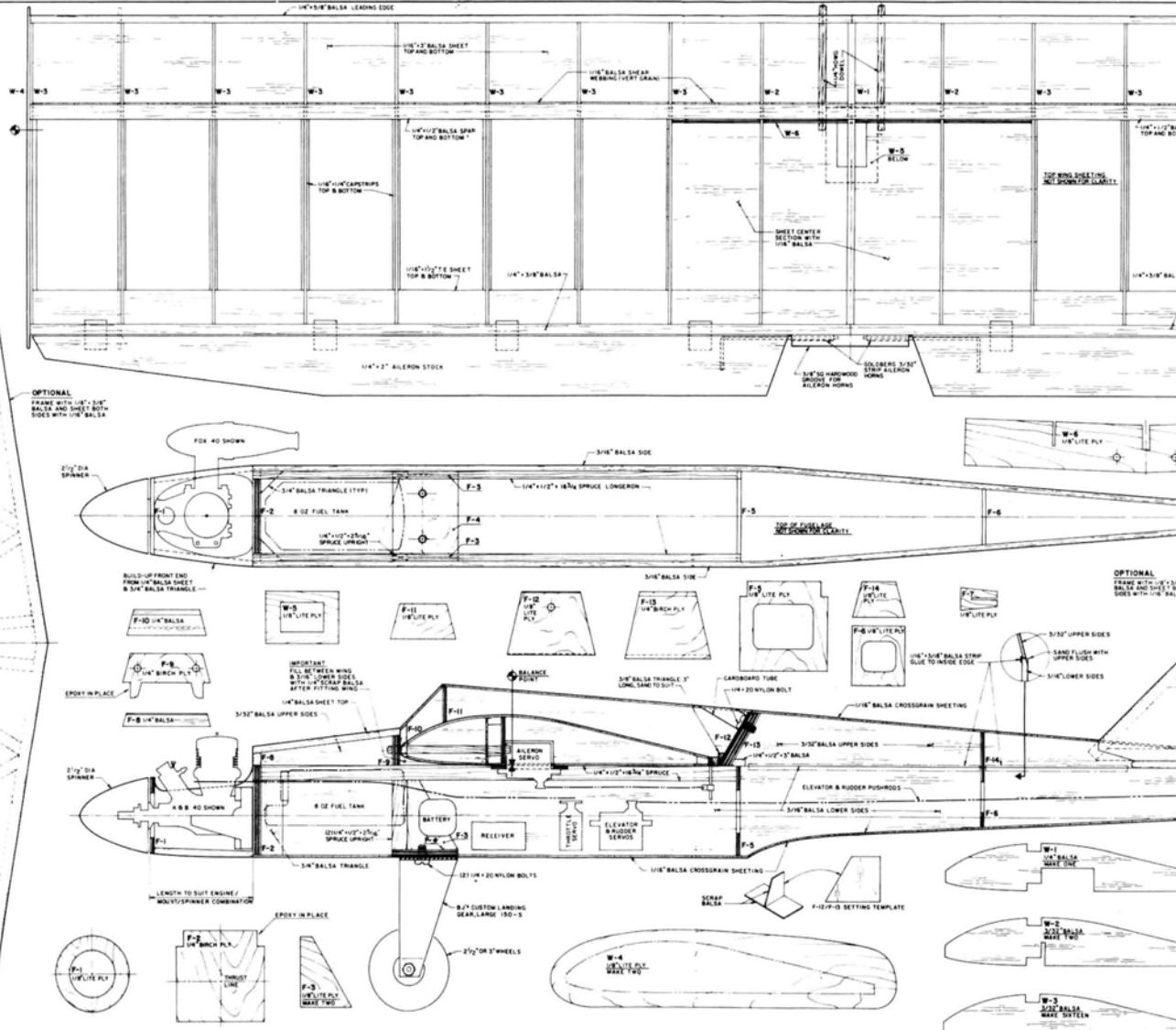
*The cardboard tube that's used as a channel for the wing hold-down bolt is formed by wrapping two layers of heavy paper around a pipe or a brass*

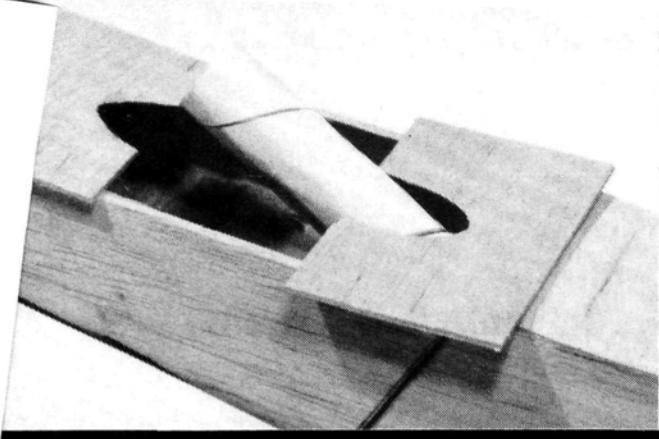
rib. This will allow a flush joint with the  $\frac{1}{16}$ -inch leading-edge sheeting. Glue the leading edge to the ribs. Now glue the  $\frac{1}{16}$ -inch balsa shear webbing to the wing spars between all the ribs. Keep the grain vertical.

Glue the  $\frac{1}{16}$ -inch top leading-edge sheeting into place. It must conform to the shape of the rib tops. Glue the trailing-edge sheeting into place. Remove the left wing panel, and glue the bottom leading- and trailing-edge sheeting to the spars and the ribs. Curve the bottom leading-edge sheeting so that it conforms to the shape of the

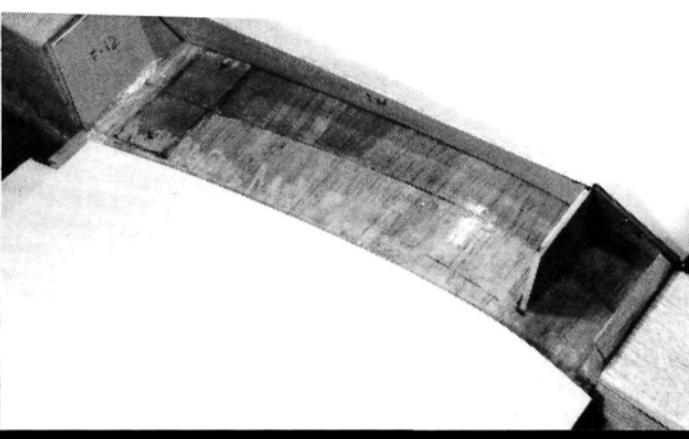
## Order the full-size plan...page 144

BUILDING MATERIALS	
BALSA, #200	
2 - $\frac{1}{4} \times 4 \times 36$ , RUDDER & N STAB	
2 - $\frac{3}{16} \times 3 \times 36$ , FUSELAGE SIDES	
4 - $\frac{1}{32} \times 3 \times 36$ , FUSELAGE RIBS	
8 - $\frac{1}{16} \times 3 \times 36$ , WING & FUSE SHEETING	
4 - $\frac{1}{16} \times 3 \times 36$ , WING RIBS	
2 - $\frac{1}{4} \times 2 \times 36$ , AILERON STOCK	
2 - $\frac{3}{16} \times 2 \times 36$ , LEADING EDGE	
1 - $\frac{3}{4} \times 3 \times 36$ , TRIANGLE STOCK	
2 - $\frac{1}{4} \times 3 \times 36$ , WING TRAILING EDGE	
4 - $\frac{1}{4} \times 1/2 \times 36$ , WING SPARS	
HARDWOOD & PLYWOOD	
2 - $\frac{1}{4} \times 1/2 \times 36$ SPRUCE, LONGERON	
1 - $\frac{3}{8} \times 3 \times 36$ HORN, ALUMINUM MOUNT	
1 - $\frac{1}{4} \times 6 \times 36$ BIRCH PLY, FUSELAGE	
1 - $1/8 \times 12 \times 24$ LITE-PLY, FUSELAGE & WING	





The cabin top (cross-grain sheeting) being fitted to the paper tube. The end of the tube has already been glued to F 12.

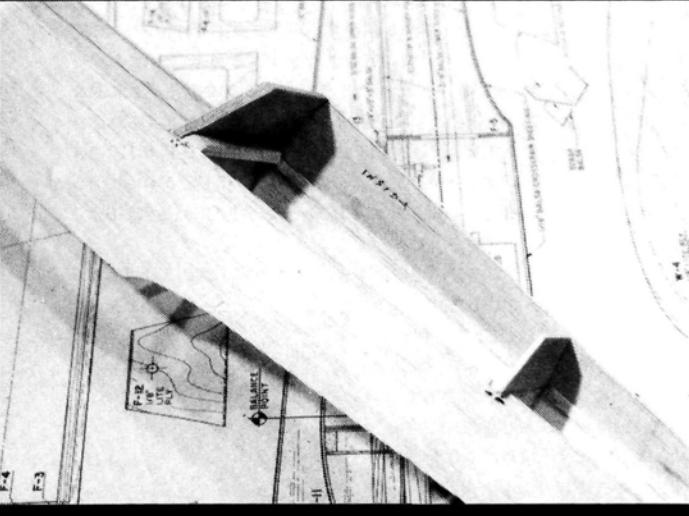


Here F 12, F 11 and one cabin side and side window have been glued into place. When installing F 12, put waxed paper between it and F 13 to avoid gluing the two together.

bottom rib.

Following the same procedure, build the right wing panel. When it's complete, put the two panels—with their centers together—onto the building board. Pin the left wing panel securely to the board and block up the right panel 2 inches, as shown on the plans. When correctly set up, insert the center rib (W-1), and pin the right panel securely into place. Check the fit of the dihedral brace (W-6). Using 30-minute epoxy, glue the wing spars as securely as possible where they join.

**• The horizontal stab** is next. Cover the horizontal-stab plan with waxed paper. If you choose to use  $\frac{1}{4}$ -inch sheet balsa, cut it to the shape shown. For a built-up stab, begin by laying out the  $\frac{1}{8} \times \frac{3}{8}$ -inch balsa frame as shown by the dotted lines. Pin and glue it into place. Prepare sheeting for the top and bottom of the stab by using a straightedge to trim the edges of four  $\frac{1}{16} \times 3 \times 24$ -inch sheets of balsa (two for each side). Run a line of glue along the edge of one sheet, press the second



Formers F 14 and F 13 and the  $\frac{1}{4} \times \frac{1}{2}$ -inch balsa cross-brace are shown here with one upper fuselage side installed. The wing is attached to F 13, so this former must be securely installed and braced.

sheet against the glue-covered edge, and hold it in place with pins. Remove it, and sand the joint on both sides of the sheets.

Next, glue a prepared sheet to the top of the frame. After the glue has set, take the stab off the building board, and trim the  $\frac{1}{16}$ -inch sheet to the frame's outline. Glue the bottom sheeting into place, and trim it to size. Round the leading edge and tips, and bevel the trailing edge slightly so that the elevator will be able to move freely.

**• Elevators** are cut out of a single piece of  $\frac{1}{4} \times 2 \times 23\frac{1}{2}$ -inch hard balsa. Don't cut it into two pieces! Notch the leading edge of the elevator and glue the  $\frac{1}{4}$ -inch square hardwood into the notch. When the glue has dried, cut out the notch in the center of the elevator's trailing edge. Sand the leading and trailing edges to the proper shape, and

FSP09911

FAIRHOPE FLIER

\$12



The Fairhope Flyer is a .40 to .60 size, shoulder-wing design that's intended for fun-fly competition. This 56-inch-span plane features simple construction, light wing loading (16.7 ounces per square foot) and 689 square inches of wing area for an all-around aerobatic sport flier—an agile, yet gentle, flier with a wide speed envelope. "Hot" fliers can build the clipped-winged version (50 inches) for increased speed and roll rate. One full-size plan sheet. WS: 56" (or 50"); Power: .40 to .60 2-stroke; 4 channels; LD: 2.

FAIRHOPE FLYER

DESIGNED BY NICK NEVILLE

DRAWN BY JERRY BATES

ALL RIGHTS RESERVED

# FAIRHOPE FLIER

hinge them temporarily, but don't glue them.

• **The vertical fin and rudder** are built using essentially the same procedure as used for the stab. Again, plans show a choice of either solid balsa or a built-up construction. In either case, be sure to install the  $\frac{1}{4}$ -inch square hardwood fin cap. Temporarily hinge the rudder.

## THE FAIRHOPE FUSELAGE

The fuselage goes together quickly and surprisingly easily. Trace the shape of the lower fuselage side onto medium-hard  $\frac{3}{16}$ x3x36-inch sheet balsa. Cut out two sides exactly the same. Glue  $\frac{1}{4}$ x $\frac{1}{2}$ x16 $\frac{3}{4}$ -inch spruce or basswood fuselage crutches to the inside of both the left and right fuselage sides as shown. Glue the  $\frac{1}{16}$ x $\frac{3}{16}$ -inch balsa strips to the top inside rear of each side. (See the plans and photographs.)

Taper a  $\frac{1}{4}$ x $\frac{3}{4}$ -inch balsa block for the fuselage tail block. Pin the right-hand fuselage side, with the inside facing upward, to the building board, and mark the bulkhead locations. Now glue F 2 (firewall), F 5 and F 6 into place. Use a 90-degree triangle to make sure these formers are vertical.

Coat the top sides of F 2 and F 5 with glue. Using the notches in formers F 2 and F 5 as guides, carefully lower the left fuselage side onto these bulkheads. Hold them in place while the glue is drying. Cut and glue 3/4-inch balsa triangle gussets to each side of the firewall (F 2) as shown. Position the fuselage upright over the plan's top view. Pin the fuselage securely to the building board. Pull the rear sides of the fuselage into contact with the previously tapered tail block and glue them to it. Glue F 6 into position. The curve of the fuselage should be the same as that shown on the plan.

The landing-gear block and F 4 can be installed now. Be sure to leave  $\frac{1}{6}$  inch of the block extending below the fuselage sides so that it will be in line with the  $\frac{1}{16}$ -inch bottom sheeting. Glue in both  $\frac{1}{4}$ x $\frac{1}{2}$ x $\frac{25}{16}$ -inch spruce uprights above F 4, taking care to ensure that they're vertical. The two landing-gear side doublers (F 3) should be installed at this time. If these pieces are glued properly, the assembly will be extremely tough, and that aluminum landing gear "ain't going nowhere."

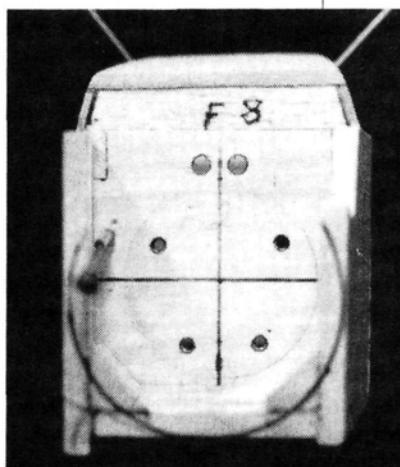
Glue F 14 into place. During the next steps, remember that F 9, F 12 and F 13 hold the wing in place and should be installed very rigidly to ensure "maximum holding

## "...that aluminum landing gear ain't going nowhere."

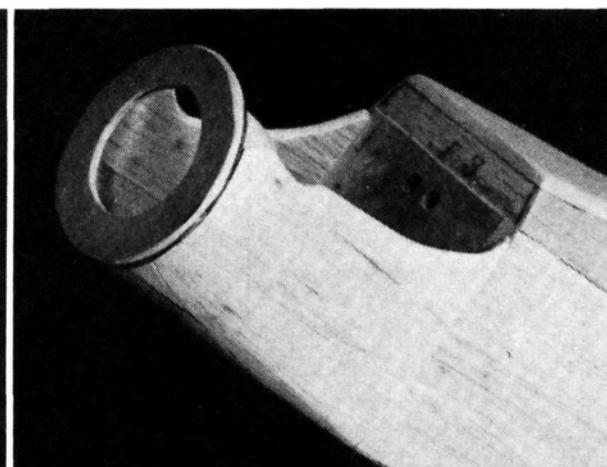
strength." Prepare F 12 and F 13 for installation by tapering the bottom and top as shown by the dotted lines. Don't install F 8 until you've drilled the wing-dowel holes! Cut out two  $\frac{3}{32}$ -inch balsa-sheet upper sides for the fuselage. Allow  $\frac{1}{16}$  inch extra so that they can be sanded flat with the tops of the slanted sides. Cut and bevel the  $\frac{1}{4}$ x $\frac{1}{2}$ x3-inch balsa brace across the fuselage at F 13. Glue the brace securely. Next, glue F 13 and the upper rear sides to the rear of the fuselage. To install the sides, use the method shown in the exploded view above F 14.

Epoxy F 9 to the  $\frac{1}{4}$ x $\frac{1}{2}$ -inch longerons. Make certain that this joint is secure enough to withstand severe strains!

Slide the horizontal stabilizer into the slot at the end of



*The cowl's sides and bottom have been installed. Cowl ring F 1 was positioned before the engine was removed, and its outline was drawn.*



*This side view shows why F 1 must be equidistant from F 2 at the top, bottom and both sides. If it isn't, the spinner won't be flush with the front of the fuselage.*

the fuselage and check it for fit. With a paint paddle that has sandpaper glued to each side, you'll make short work of beveling and enlarging the slot (if necessary). Don't glue the stab into place until you've completed the covering. Sheet the top rear of the fuselage with  $\frac{1}{16}$ -inch, cross-grain, sheet balsa.

Prepare the tail-wheel axle/tiller arm for installation by bending it to shape. Epoxy F 7 into place and install the Goldberg\* tail-wheel bracket. Leaving the bottom rear 3 inches open until you've installed the pushrods, sheet the rest of the bottom—again, using  $\frac{1}{16}$ -inch balsa applied cross-grain. When the pushrods have been installed, sheet the remaining 3 inches. Trim the sheeting flush with the fuselage.

Before sheeting the fuel-tank compartment, install the fuel tank. Now, from  $\frac{3}{32}$ -inch sheet, cut out the tank compartment's upper sides. Cut so that the sides are high

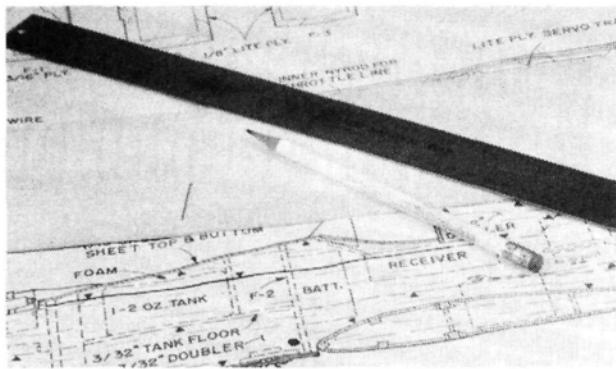
(Continued on page 82)

# HOW TO:

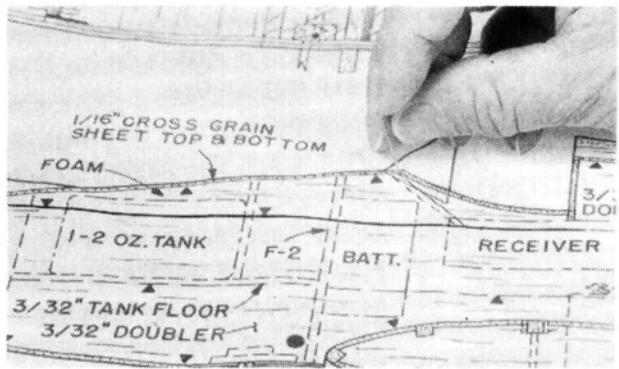
## MAKE A PINPRICK TEMPLATE

by RANDY RANDOLPH

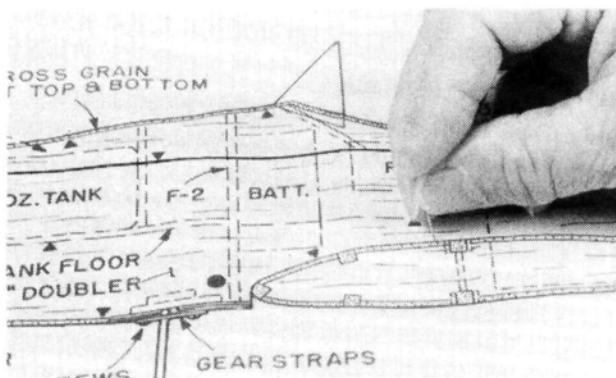
Sheet-balsa sides and tail surfaces are the norm on most R/C aircraft. The pinprick method is probably the best way to transfer the outline of a fuselage side (or any part) from the plan to the wood; it's also a good way to avoid damaging or cutting plans. Thanks to Tom Anderson for reminding us about this handy system.



1. You'll need the plan, balsa sheet of the correct size, a straightedge, a pencil and the modeler's friend—a pin.



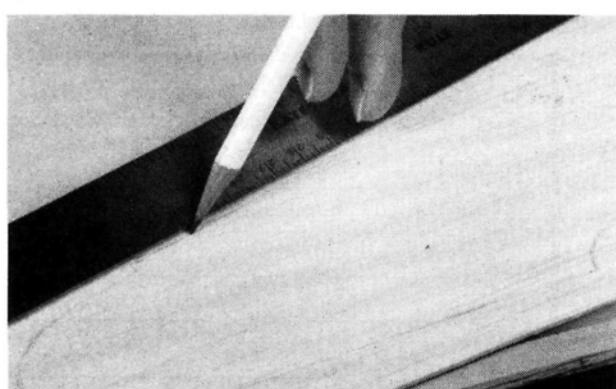
2. Position the balsa sheet under the plan, and pin the plan to the sheet so that it won't move. Push a pin through the plan to mark all the straight sides of the part and the bulkhead locations with pinholes.



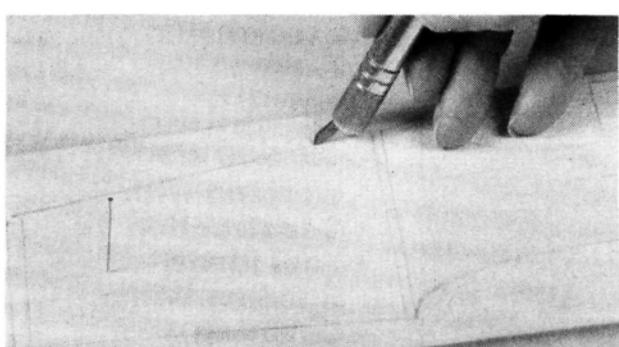
3. After you've pricked the wood at all the points that can be joined with a straightedge, mark the curved areas. These pinpricks should be about  $\frac{1}{8}$  inch apart for small radii, but they can be  $\frac{1}{4}$  to  $\frac{1}{2}$  inch apart for more gentle curves.



4. Uncover the balsa sheet and, keeping an eye on the plan, join all the pinpricks in the curved areas with a pencil or a fine-tipped pen. Be exact.



5. Next, use the straightedge, and join the pinpricks that outline the straight areas; then mark all the bulkhead or doubler locations.



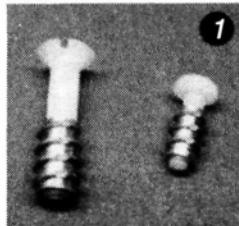
6. Pin a second balsa sheet underneath the first one, and cut out both sides of the part at the same time. For tail surfaces (or other parts) use the same technique. The resulting parts are very accurate—more accurate than if you had used a tracing as a template.

# —beats blind nuts! USE Threaded Inserts

Nylon bolts are commonly used to attach wings and other parts to models. The bolts can be screwed into a variety of mounts, such as threaded hardwood or blind nuts. Threaded inserts provide another technique with several advantages:

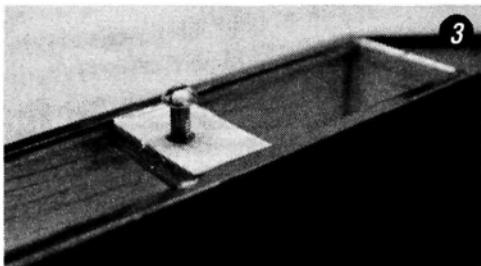
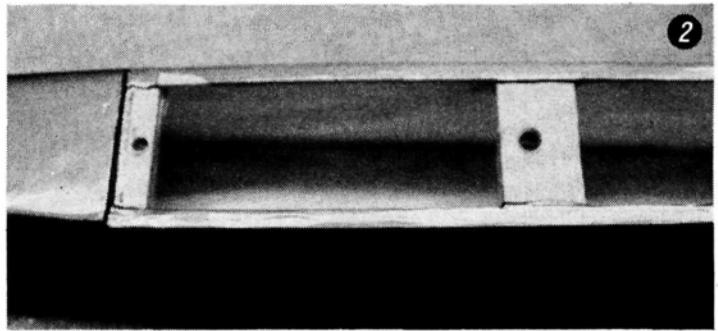
- You don't need special tools like a tap to thread the hole.
- Mounting is very easy: just drill a hole of the proper diameter.
- The inserts provide a better permanent mount and won't come out of the holes like blind nuts.

These step-by-step photos show how to install threaded inserts to mount a wing.



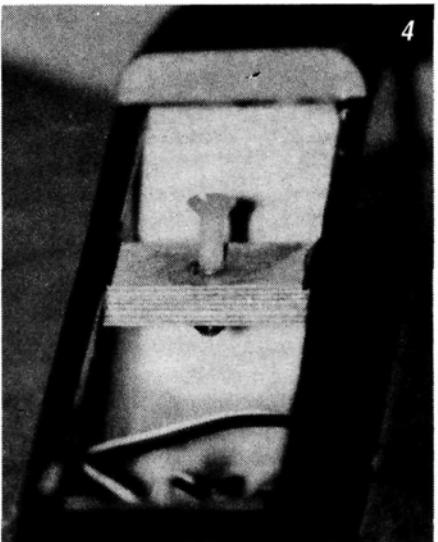
1. Threaded inserts are made of brass with machine threads on the inside and a coarse, self-threading exterior. Small quantities of inserts in sizes that are suitable for modeling can be bought from Du-Bro\* and most hobby dealers.

2. Drill holes for the threaded inserts. The inserts should be installed in a hard material like hardwood or plastic. The proper hole sizes are listed on the package.

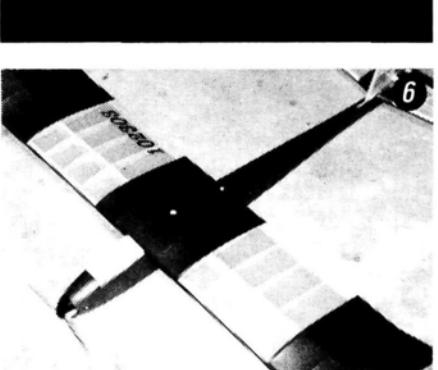


3. Screw the threaded inserts into the holes. A steel machine screw can be used to drive in the insert. For extra security, apply a thin coat of epoxy to the outside of the insert before screwing it in.

4. Remove the steel screw, and your bolt mount is now complete. Mounting is especially easy in restricted areas where there would be an access problem if you tried to install a blind nut from the rear.



5. The modified Mini Challenger. A pan-head 10-32 bolt is mounted flush with the wing's surface near the spar. The rear bolt is a 6-32, so it can easily shear if a wing tip hits hard, and this will allow the wing to rotate. Be sure to add a hard surface to the wing for the bolt to be tightened on. (Plywood or epoxy/glass plate work well.)



6. The finished model, ready to fly.

\*Here's the address of the company featured in this article: Du-Bro Products Inc., P.O. Box 815 Dept. EP, Wauconda, IL 60084.





**■ This is just the left corner of the large, beautiful flying site at the Palm Beach Polo & Country Club in Palm Beach, FL! Note the spacious flight line. In the distance—"Hamilton Lake." Inset: onlookers packed the grounds during the flying competitions.**

PHOTOS BY YAMIL SUED & TOM ATWOOD

by TOM ATWOOD

**T**HE 1991 TOP GUN Invitational, the third Top Gun in as many years, was the biggest and most colorful yet. From Thursday to Sunday, May 2 to 5, over 50 scale masterpieces vied for



**■ Kent Walters, chief judge (left); and Frank Tiano, Top Gun originator and our "Sporty Scale" columnist (right), formed a mobile "nerve center."**

more than \$25,000 in cash and prizes. Scale models of some of the finest planes in the history of aviation were exhibited and flown in what many regard as the finest scale aeromodeling contest!

(Continued on page 47)



**■ Left: Boosted by two O.S. 91 fan engines powering Dynamax fans, Bob Fiorenze's 27-pound, 118-inch-long F-18 easily leaps into the air. The Yellow Aircraft kit, which won the '85 Nats, the '88 Masters and the '89 Top Gun competitions, put on an awesome performance.**



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the best

# '91 TOP GUN



■ Top right corner photo: Bob Violett's new F-16 taxis off the runway after an exhibition flight. ■ Above left: Mel Whitley's scratch-built, O.S. 300 twin-powered Sea Fury accelerates along the runway. ■ Above right: First-place winner Mel Whitley poses for the press with his trophy, a check for \$2,000 and the considerable prizes stacked behind him. ■ Geoff Combs (builder) and Kim Foster (pilot) won 1st place in Team Scale with this fabulous Curtiss Jenny, which was built stock from a Proctor kit. Powered by a Laser 75 4-stroke, the plane also took High Static.

# TOP GUN

■ Model Airplane News Editor Emeritus Rich Uravitch built this stunning North American SNJ-5C Texan, flown here by Nick Ziroli, Jr. The 29-pound plane featured a Zenoah G-62 with a smoke system and a fully detailed cockpit.



■ Left: Richard Crapp's scratch-built deHavilland DH89 M Dragon Rapide is a Solartext-covered, 35-pound beauty with a wingspan of 148 inches. Powered by two Enya 120 R 4-stroke engines, the plane included 12 spring-loaded bomb-bay doors, a landing light and a top, rear gun turret.

■ Right: Shailesh Patel's Webra Bully-powered P-47 flew well, but it was lost during the meet owing to an in-flight structural failure (flutter suspected).



■ Above: David Toyer's nylon- and dope-covered, 40-pound Hurricane (one of the largest models at Top Gun) has a wing-span of 120 inches and is powered by a King 100 spinning a 28x10 prop. David hails from Northamptonshire, England.



■ Above: After a landing with only one wheel down, Bill Carper and his assistant carry in Bill's undamaged Super Tigre 3000-powered, 25-pound Spitfire (a Yellow Aircraft kit).



■ Above: This Fokker DR-1, which was built from a prototype Glenn Torrance Models kit, was one of several WWI craft at Top Gun. The 15-pound plane was motivated by an O.S. 160 twin and a 18x8 DW prop.



■ Left: The Lear 35, piloted by R/C magician Dennis Crooks, looks very scale-like in flight. Despite a serious crash late in the meet, the plane flew again the same day—a real testament to Zap!



■ Left: Wayne Siewert's Ki-84 Frank, the radial version of the Japanese Tony, lands on one wheel. The right landing gear was quickly repaired. ■ Below: Wayne Siewert prepares his Ki-84 Frank for flight. It took Critics' Choice (exceptionally authentic weathering detail). The Focke Wulf 190 D9 (in middle background), which was built by Michael Richardson, was flown by Ray Chardella.





■ Above: David Voglund's P-40E prepares to "belly-in." The 17-pound airplane has a wingspan of 82 inches and is motivated by an O.S. 120 4-stroke.



■ Above: Fred Beard turns over the prop on his Tiger Moth.



■ Above: Dennis Crooks prepares to dazzle the crowds with the amazing SR-71 fan jet. ■ Right: Art Johnson's aluminum-clad P-35A lights up the polo grounds in the midday sun.



■ Below: The Rockwell Thrush (built by David Hayes) comes in for a landing after "spraying" the polo grounds for insects. This plane carries an O.S. 91 Surpass 4-stroke; the "repellent" was fire-extinguisher powder and grits!



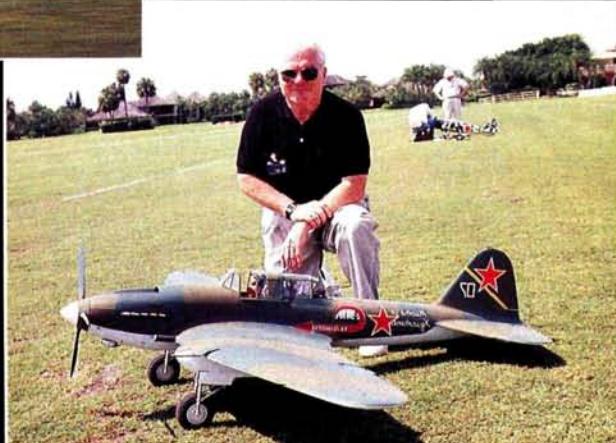
■ Above: Diego Lopez took 4th overall with this U.S. Air Force Skyraider, decked out in camouflage (Southeast Asia theater). This was one of three competing Skyraiders designed by Rick Lewis and powered by Webra Bully 3500s.



■ Above: The Curtiss Jenny in flight; the plane sports functional guide wires.



■ Left: Scott Foster's P-47D, which was built from a Bert Baker kit, sported an immaculate automotive-paint finish. A Webra Bully spinning a Zinger 18x8 prop propelled it.



■ Left: Bill McCallie's 80-inch wingspan P-40-N, with its distinctive white tail, was based on New Guinea 49th Fighter Group markings. A Super Tigre 2500 and a Zinger 18x6-10 prop powers the 19.5-pound model. ■ Above: Bob Underwood (AMA technical director) shows off his impressive Stormavik low-level attack plane. An O.S. 108 and a Zinger 15x6 prop pulled the 17.5-pound plane.



# TOP GUN



■ Above: Edward Esteves' Rearwin Skyranger—an immaculately scratch-built model—has won contests in Brazil. The O.S. 10B-powered plane spun a Zinger 18x6 prop.



■ Above: Mike Kestner's P-38 put on an impressive demonstration flight. Two 4.2 Sachs-Dolmars (one running in reverse) spun scale, three-blade Zinger props. The plane was scratch-built from CB plans. ■ Left: The hydraulic brake system in Mike's P-38 used 3-in-1 Oil in a piston designed for a pneumatic system—no leaks!

■ Right: Jim and Maury Maroney teamed up to build this 19.5-pound P-51D powered by a Super Tigre 2500 spinning an 18x8 prop.

■ Far right: Andre Nougier and Roland Inguimbert of France work to cut off the Rossi 65 in the Byron-kitted F-20 after a belly landing from a takeoff run. The plane flew on the last day—to the crowd's roar of approval.

## Patti Violett,



## JET PILOT

**P**ATTY VIOLETT, the only female pilot competing at Top Gun, and Paul Schuessler, her team partner, took 3rd in the Team Scale competition.

Curious to know what Patty thought of flying in this prestigious competition and what Paul's thoughts were on the event, we spoke briefly with them after the awards ceremony.

**MAN:** How long have you been flying R/C models?  
**Patty:** For about 8½, close to nine years, and fan jets, probably four years.

**MAN:** Did your F86 win any awards before this Top Gun?

**Paul:** No, this plane has about eight flights on it, and it was test-flown just prior to the event. I have to give Bob Violett a lot of credit for a great model.

**MAN:** Patty, have you competed in many contests?

**Patty:** When I first started flying, I competed for approximately three years in pattern, then I was out of competition for a few years.

*This is my first competitive contest since then.*

**MAN:** Was there a sense of neck-and-neck competition here at Top Gun?

**Patty:** There was. The top three teams were close.  
**Paul:** It was an intense experience, it really was.

**MAN:** Were you following the scores closely?

**Patty:** I wasn't watching the scores too closely—I was mainly concentrating on making each flight my best and studying the skills of the other competitors.

**Paul:** Not so much the scores, I focused mainly on having the airplane ready to go for Patty.

**MAN:** I'm sure our readers would be interested in your flight routine at Top Gun.

**Patty:** It included takeoff, tank drop, slow-speed pass, high-speed pass, Immelmann turn, straight inverted flight, slow roll, victory roll, rectangular traffic approach and landing.

**MAN:** Congratulations on placing 3rd!





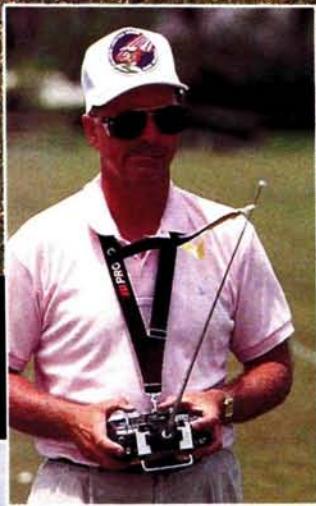
■ Above: Garland Hamilton's F-86, which was built from a BVM kit.



■ Paul Schuessler, Patty Violett, Terry Nitsch, Bob Violett and Ron Gilman in the winners' lineup. Ron's Skyblazer (not shown) went in white flying with the BVM F-16 exhibition plane.



The BVM F-86 group: owners (from left to right)—Bill Harrelson, Bob Violett, Terry Nitsch, Ron Gilman, Patty Violett and Paul Schuessler, a BVM exhibition model and Gerry Gudie. Garland Hamilton's model hadn't yet been repaired after its sinking in "Hamilton Lake."



■ Above: Ron Gilman's face shows intense concentration. ■ Ron Gilman's Skyblazer on one of its last flights.



■ Left above: Terry Nitsch's F-86F drops its tanks. ■ Left: Garland Hamilton (left) and Bob Violett (right) prepare Garland's F-86F for flight.

exhibition in the U.S. today.

After weeks of eager anticipation, I eventually arrived at the luxurious Palm Beach Polo club in West Palm Beach, FL, the site for this year's Top Gun. Posters advertising the event taped to street signs at freeway exits 15 miles away, custodians at

all points of entry to the grounds, and a large concession area preparing for the crowds indicated the event had been planned to run like clockwork. Still, I wasn't prepared for the eye-opening spectacle that was in store!

At the flying site, a large concrete stadium crowned with a "control tower" faced a huge, well-manicured flying field. One couldn't help but be impressed by the large expanse of closely cut grass stretching across multiple polo fields.

Chalk lines delineated the runway and the flight lines along the field. A second runway was set at a 45-degree angle to the first to accommo-

# TOP GUN

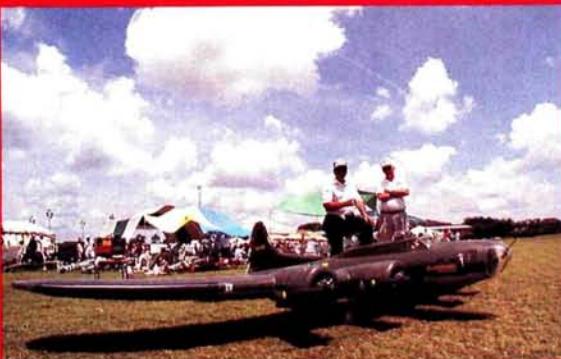


■ Nick Ziroli's Beech 18 in flight. Built by Bill Steffes, it took 2nd in Team Scale and Best in Military. Bill commented, "My eyes are now very 'pinpointed' from putting all those rivets on."

■ Bill Steffes holds Nick's Beech 18 plane in Static Competition while Nick stands by. The plane was amply powered by a Quadra 35 spinning a 19x6-10, and it flew well.



■ Corvin Miller and his all-balsa-and-ply Globe Swift that took Best Civilian. The plane was designed after WW II as a civilian aircraft that would handle like a fighter. This Globe Swift detail shows its full cockpit. It sports a Gemini 160 engine, weighs 20.5 pounds and has a wingspan of 81 inches.



■ B-17 on the flight line awaits its exhibition flight. (A) The left wing folds during an approach out of a banking turn. (B) The plane rolls onto its back. (C) It disintegrates on impact.



## FINAL FLIGHT OF A FORTRESS

The largest model to fly at Top Gun (it didn't compete) was a majestic, 1/7-scale B-17 modeled on the Memphis Bell, which was the first

Flying Fortress to complete 25 missions in WW II. This R/C Leviathan was less than a year old when it suffered the unfortunate mishap shown in the photos.

This magnificent B-17 was powered by four, 2.4c

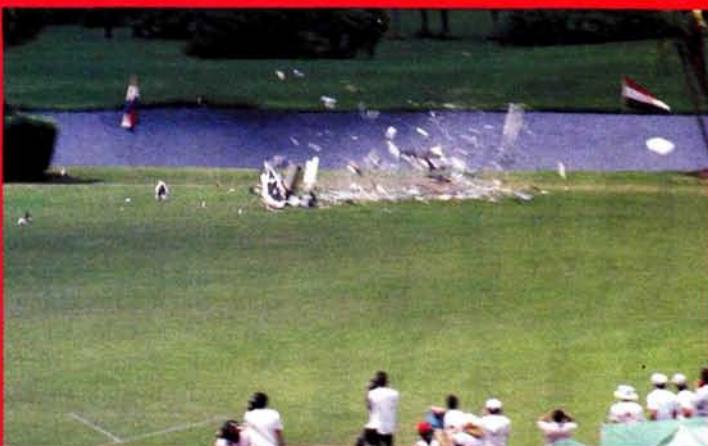
date changes in wind direction. Several hundred feet to the left, past

a few palm trees, a large pond reflected a blue sky that was beginning to fill with giant cumulous clouds. Throughout the meet, cooling breezes accompa-



■ Left: Gene Barton's Gray Skyraider took 7th place overall. ■ Below: The commando-bottom under this Skyraider wing simulates one dropped over Hanoi during the Vietnam War.





**Koritz engines, each spinning a three-blade Zinger 18x6-10 prop. Thousands of spectators were mesmerized as it droned across the sky, the sound of its engines resonating deeply in realistic scale flight.**

**Built and flown by Bob Campbell, of North Canton, OH, the 11-foot Fortress had a wingspan of 16 feet, 4 inches and weighed 98 pounds. Its fuse was constructed entirely of foam sheeted with 1/8-inch balsa, and it was covered with 75 feet of MonoKote. Fifteen servos driven by a Futaba PCM radio activated its control systems.**

In flight, its wings had been seen flexing slightly, but Jim Moorhead (Bob's flight-line assistant) said that the wing spars were made of aluminum with hard dowel cores and that the flexing was intentional. How did the midair breakup occur? At the end of a gentle left turn from altitude, the plane was lining up for an upwind, left-to-right, low-level pass. As the nose came up at the bottom of the turn, its left wing folded. The crowd gasped as the model fell tragically and crumbled into foam chunks well out on the flying field.

nying the intermittent clouds would provide a welcome break from the heat of the Florida sun. Temperatures remained in the low to mid-80s and hu-

midity was high.

As the awnings and sun screens went up, the first models were brought to the flight line to be readied for static judg-

ing. The mood was friendly and, judging from the smiles and the excited voices, everyone was determined to have a great time.



Above left: Charlie Chambers' Mustang on takeoff. He won the High Flight award. Left: (left to right) Frank Tiano; Joe Bazinet, Palm Beach Aeroclub president; Sam Wright, announcer; and Charlie Chambers as he receives the award for Best Markings. He also won \$500 and prizes for 5th place overall. Above: close-up of Charlie Chambers' aluminum-clad Big Beautiful Doll P-51D, which took Best Markings and 5th place overall. (oki 2500 engine spins a Zinger 16x8 prop. Photo by John Jundt.)



Right: Chauncey Dance and Michael Oldowsky entered this beautiful 19.5-pound biplane Sú-1 in Team Scale (made from a Bob Wiley kit). It's powered by an ultra-quiet, 2-rode radial made from six K&B Sportster 20 engines (from Radial Engines Technologies).

# TOP GUN

## STATIC COMPETITION

Forty pilots registered in Expert Class and 14 teams in Team Scale. Top Gun judging is based on the Top Gun rule book, and it differs from some of the other major scale competitions. Unlike the Scale Masters, Top Gun allows one gyro to be used on the rudder. Another difference: at Top Gun, "craftsmanship" is judged at a distance of 3 feet (8 feet at Scale Masters; AMA standoff scale is 15 feet). As a result, Top Gun encourages

the very highest level of scale craftsmanship. Moreover, Top Gun rules permit a judge to approach the airplane for close inspection at any time, if this is needed to clear up a discrepancy.

Kent Walters, chief judge, oversaw a team of three judges who spent Thursday and Friday examining each entry (see sidebar). Models were staged for a 15-minute evaluation. As the day wore on, the drone of planes making practice

flights picked up in intensity. On the first day, Hal Parenti's Ryan Fireball, which was propelled by a prop and a fan jet, succumbed to aileron flutter. It was the first of five competition planes to be lost at Top Gun.

At the end of the Static competition, the front-runners in Expert Class were Steve Sauger's Aeronca, an FAI team aircraft with a 90-inch wingspan, Charlie Nelson's Waco, Terry Nitsch's F-86F, Bob Hanft's Fokker triplane and Art Johnson's aluminum-skinned P-35A. In Team Scale, the top static score was captured by the Curtiss Jenny entered by Geoff Combs and Kim Foster. Second and 3rd Team Scale positions in Static (they were only a hundredth of a point apart) were held by the Patty Violett/Paul



Diego Lopez during the static judging of his Skyrider.

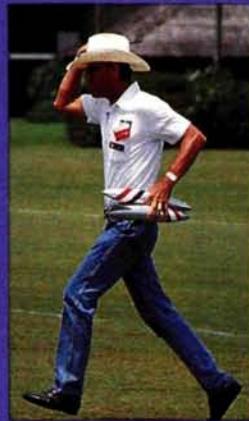
## Judges' Row

**K**ENT WALTERS, chief judge at Top Gun, is an accomplished scale competitor and a writer on technical scale subjects. Kent took a few minutes out of his busy schedule to brief us on Top Gun scale judging.

Static scoring was done by a panel of judges who considered three things as they looked carefully at each plane: scale outline; finish, color and markings; and craftsmanship. The judges examined three-views and photos and could discuss the plane being judged, but they weren't permitted to discuss actual scores with each other. Kent said that the only time the judges were in curious disagreement, they soon realized at least two were looking at different sets of three-views!

Each pilot flew four rounds of 15 minutes each, with the best three averaged. Scoring was based on five mandatory and five optional maneuvers. The mandatory items included takeoff, two low flybys (one fast and one slow, in "high-drag" configuration, i.e., with the flaps and gear deployed), traffic pattern and landing. The optional maneuvers depended on the type of plane. A jet might do a four-point roll or an axial roll. On the other hand, a WW I type might perform a split-S, an Immelmann turn, etc.

I asked Kent whether the competition was keener at this, the third Top Gun. "Oh, certainly; this was superior to the last one I saw, in terms of who comes, particular modeling skills and construction. A wide variety of aircraft are here; the best variety, I think, that one can see in these types of notable events." I asked whether Kent was ready to jump back into competition. "Oh, absolutely, I'd much rather be competing than doing what I was doing this weekend, chief judging. I've been telling everybody that all weekend long!"



Chief Judge Kent Walters picks up tanks and scoots off the field during competition.

# TOP GUN WINNERS

## EXPERT CLASS

### Pilot

	Aircraft	\$Prize
1. Mel Whitley, Lynn Haven, FL .....	Sea Fury .....	2,000
2. Terry Nitsch, Columbus, OH .....	F86F .....	1,500
3. Ron Gilman, Rosamond, CA .....	F86 Skyblazer .....	1,000
4. Diego Lopez, Corona, CA .....	Skyraider .....	700
5. Charlie Chambers, Coral Springs, FL .....	P-51D .....	500
6. Charlie Nelson, Berlin, MA .....	Waco Bipe .....	300
7. Gene Barton, Garden Grove, CA .....	Skyraider .....	100
8. Bob Violett, Winter Springs, FL .....	F86F .....	100
9. Bob Fiorenze, Winter Springs, FL .....	FA-18 Hornet .....	100
10. Corvin Miller, Sarasota, FL .....	Globe Swift .....	100

### TEAM SCALE:

1. Geoff Combs, Pickerington, OH; Kim Foster, Mansfield, OH: Curtiss Jenny .. \$800
2. Nick Ziroli Sr., Central Islip, NY; Bill Steffes, Schenectady, NY: Beech 18 ..... 500
3. Patty Violett, Winter Springs, FL; Paul Schuessler, St. Louis, MO: F86F ..... 300

### OTHER:

- Engineering Excellence: Mark Frankel, Ardmore, PA—Lear 35  
 Best Military: Bill Steffes—Beech 18  
 High Static: Kim Foster—Curtiss Jenny  
 High Flight: Charlie Chambers—P-51D  
 Best Markings: Charlie Chambers—P-51D  
 Best Biplane: Richard Crapp, Hazelmere, England—D.H. 89 Rapide

(P-51D), closely followed by pilot Patty Violett flying a BVM F-86F built by team member Paul Schuessler. Sydney Clement and Reno Farinelli were also a close 3rd, but ultimately, Sydney's consistently able flying (Yellow Aircraft CAP 21) wasn't enough on its own to boost them to the winners' circle.

The warm weather, high humidity and grass required some of the ducted fan fliers to raise their rpm levels slightly, but nearly all the jets flew well despite these conditions.

When the competition was over, Mel

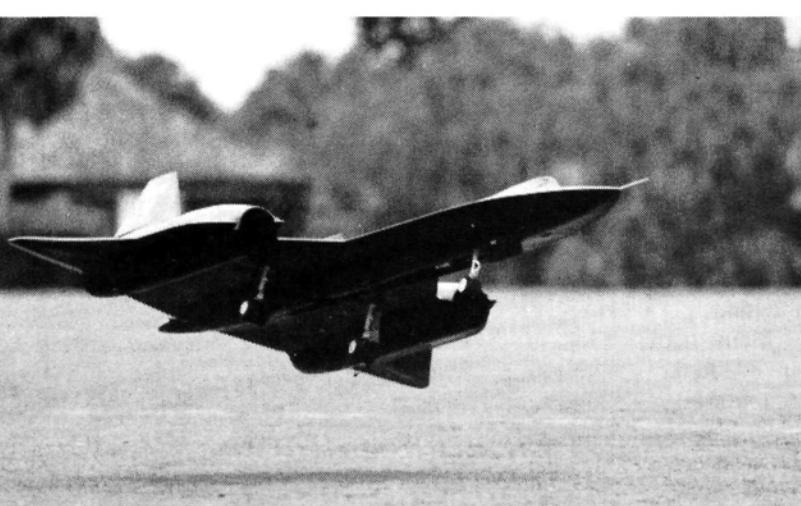
Whitley took 1st place in Expert Class, and Geoff Combs and Kim Foster shared 1st in Team Scale. Patty Violett and Paul Schuessler lost 2nd place in Team to Nick Ziroli Sr. and Bill Steffes by only seven hundredths of a point!

George Leu, a judge at all three Top Guns, said "This was the highest level of flying competition that I've seen since Top Gun's inception."

## AMAZING MODELS

As the pictures show, there was enough modeling wizardry at Top Gun to fill books on the subject of scale modeling. The Skyraiders flown by Diego Lopez, Gene Barton and Rick Lewis had been miniaturized by Rick from Douglas Aircraft drawings. The wings were hinged and would fold up or down on command. Actuation, powered by a Pittman electric motor turning a jackscrew, took 18 seconds from full fold to full extension.

Art Johnson's P-35A simulated the first all-metal, retract-equipped, low-wing plane in the U.S. Air Force (some of these saw action in the Philippines after Pearl Harbor). The plane was all balsa with a scale airfoil section. It was built from plans based on measurements of the full-scale plane (one of two still in



■ This SR-71 exhibition plane was brought by the Mark Frankel/Dennis Crooks team and flown by Dennis. The 23-pound plane (a Yellow Aircraft prototype) has been clocked at 148mph. It left thousands spellbound.

# TOP GUN

existence) at the Weeks museum in Miami and printed from ModelCAD. Notably, the plane is entirely clad in 1/5,000-inch-thick sheet aluminum. Art commented, "I put on many panels, probably over 100; the aluminum won't handle too much of a compound curve. All panels are overlapped to conform to the air stream, just like the original." Covering the plane took about 32 square feet of aluminum and added a little over 2 pounds to the 22-pound plane. Art's plane was powered by an O.S. 3500 BGX spinning an 18x10 Zinger. It also featured split, trailing edge, multi-section flaps, and it was controlled by a Futaba radio.

Charlie Chambers' Big Beautiful Doll P-51D, which took 5th place and Best Markings, was the only other airplane covered in aluminum sheeting. Charlie noted, "The biggest weight penalty isn't the aluminum but the contact cement. You mask the plane and then spray the cement onto the fuse and the aluminum panels." Built from Dave Platt plans, Charlie's airplane used all 10 channels on his JR PCM 10. These included the standard four (ailerons, elevator, rudder and throttle) and onboard ignition, onboard mixture, flaps, gear with sequencing gear doors, oil cooler and radiator doors (which allow cooling air to circulate through the plane) and tanks or bomb drop.

Mel Whitley designed his 1st-place, completely scratch-built Sea Fury from three-views. The 26-pound plane, which was powered by an O.S. 300 twin spinning a 26x10 Zinger, is sheeted in 3/32-inch balsa and covered in .6-ounce glass/cloth. The cowl and spinner are fiberglass, and the retracts are Mel's own design. Mel notes that he's selling plans.

## EXHIBITION FLYING

No less impressive than the competition planes were the exhibition aircraft. Dennis Crooks flew the SR-71 so im-



■ Frank Tiano, the "Don of R/C," shows how he managed such a complex event so efficiently: by making offers you couldn't refuse. (Photo by John Jundt.)

pressively that nearly everyone on the field was transfixed during his flights. The plane streaked overhead with an otherworldly metallic ring, its O.S. 91s pushing its 23-pound weight through the air at an estimated speed of more than 140mph.

The B-17 bomber flown by Bob Campbell was equally entralling in the air, but it unfortunately broke up during flight (see sidebar)—a sad end to a 1,200-hour building project. Tim Schoonard of Miniature Aircraft performed magic with his demonstration helicopter, and Don Muddiman of the Cloud Dancers startled all with the

high-speed antics of his "Flying Machine."

"Bubba" Spivey (Lanier R/C) and his co-pilot, Wayne Voyles, flew smoke-equipped Stingers in a crowd-pleasing aerobatic exhibition.

Top Gun wasn't just a daytime event; Thursday- and Friday-night cocktail parties and a Saturday-night dinner dance added to the fun.

Many thanks are due to the people who made Top Gun '91 a success. These include: Frank Tiano—the driving



■ "Bubba" Spivey of Lanier R/C reveals the secret to wowing the crowds with exhibition-team flying: practice all maneuvers on the ground first. (Photo by John Jundt.)

force behind all three Top Guns; Kent Walters—chief judge—whose guidance maintained fairness while minimizing stress; Sam Wright and David Platt, who served as announcers and maintained a funny, informative, fast-paced commentary; the 11 Flight and Static judges who worked so diligently; members of the Palm Beach Aero Club who helped coordinate the event; Pacer Technology, and the host of supporting sponsors who generously provided products for Top Gun Awards. If you have a chance to attend the next Top Gun, to be held once again in West Palm Beach, don't miss it! ■

*In addition to the cash prizes, winners received products supplied by Model Airplane News, Pacer Technology and these generous sponsors:*

**Ace R/C**—Critics' Choice: new 8-channel computer radio

**AeroLoft**—Best Markings: trophy and \$200. certificate

**Airtronics**—8-channel and 4-channel radios

**Byron Originals**—High Flight: \$200 cash; all contest fuel (4-stroke, Super Tigre, sport)

**Bob Violett Models**—1st Place: F86 Sabre Kit (\$500 value)

**Cox Hobbies**—R/C ready-to-fly kit

**Dave Platt Models**—FW-190 kit (\$400 value)

**Eagle Editions**—(Jerry Crandall) \$1,000 worth of signed aviation prints

**Frank Tiano Enterprises**—Cash prizes and awards

**Futaba**—7-channel and 6-channel radios

**Glenn Torrance Models**—Top Gun programs

**Hangar One**—5.5-inch-scale aluminum wheels/tires

**Hobbico**—O.S. 40 engine

**House of Balsa**—six kits

**Impact Engineering**—1/5-scale retracts

**Innovative Design**—Transmitter Totes

**J'Tec**—Assorted mufflers

**MGA**—10 pilots

**McDaniel R/C**—Nystarters; gift certificates; on-board glow drivers

**Orange Blossom Hobbies**—all fuel cans and fuel pumps used

**Propwash Video**—Video tapes for top 10 winners

**R/C Report**—Best Biplane: \$200 cash award and trophy

**R/C Kits**—gift certificate

**Robert Mfg.**—Engineering Excellence: \$200 cash and trophy

**Royal Products**—ARF trainer for raffle

**Tanzer Plans**—complete set of building plans

# BUILDING

## MODEL AIRPLANES



*My decade-old "Screech Owl" is an excellent example of what can be done with "old-fashioned" model-finishing methods.*

by JOE WAGNER

### The dope on Koverall

THOUGH iron-on coverings are very popular these days, quite a few modelers still prefer doped-fabric finishes for their model airplanes. Silk and silkspan are the traditional materials, but I've found that Sig's\* Koverall polyester fabric has many

advantages over both of these—if you know how to use it!

Koverall is inexpensive, light, incredibly strong, impervious to moisture, and it "heat-shrinks" drumhead tight. Sig provides application instructions with their material, but I've discovered a few additional techniques that will help you attain perfect covering jobs with Koverall.

Owing to the way the material is packaged and shipped, it contains folds and wrinkles, especially if you buy the large

"economy size" to get the best price (about 25 cents per square foot in the 5-yard package). It's tempting to iron out these wrinkles before you cover your model, but *don't do it!* Remember, Koverall is heat-shrinking. Apply the fabric as it comes, wrinkles and all, because pre-ironing it can result in uneven tautening and warps on wing and tail surfaces. You can pull many of the wrinkles out as you attach Koverall to your airplane; the rest will vanish without a trace when you heat-shrink it.

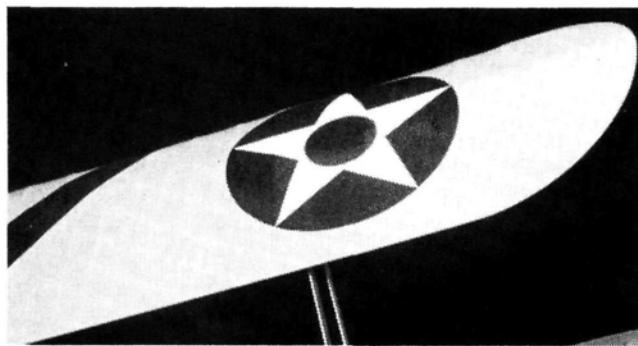
Koverall's weave is tighter than silk's, and that makes it far easier to finish. Dope doesn't pass through the Sig fabric rapidly and puddle-up on the underside as it does so easily with silk. This is why it takes fewer coats of dope to seal Koverall and produce a smooth, glossy surface.

Always use brushed-on nitrate dope for the first two coats. Koverall is a synthetic

fabric, and its smooth fibers have no liquid-absorbing ability. Dope has to adhere to them via its inherent "stickiness," and nitrate is far better for this than butyrate. Nitrate dope isn't glow-fuel-proof, though, and it's highly flammable, so butyrate is superior for the color-finish coats.

Last week, I exploded an ancient superstition about dope finishing: you *can* apply nitrate dope over butyrate with no problems at all. I was forced to use this "forbidden" technique to repair a model that had been in a minor crackup. Though the airplane wasn't structurally damaged, because its butyrate dope finish contained insufficient plasticizer, the silkspan covering on one wing shattered like thin ice.

I stripped and recovered the entire wing with Koverall, and I *had* to use



*A close-up of the Screech Owl's wing shows a flawless finish achieved with Koverall and brushed-on dope. Even the markings are brush-painted.*

# MASTER AIRSCREW



- Efficient wide tips and thinner airfoil sections combine for greater thrust, more noise suppression.
- Will out-perform wood & other plastics on water and on sand & gravel runways.
- Made of strong, 33% glass-filled nylon.
- RPM rating: 160K divided by diameter in inches.

## 1/2A Series:

5.5x4, 5.5x4.5,  
6x3.5, 6x3, 6x4..... \$ .99

## G/F Series:

7x4, 7x6.....	1.25
8x4, 8x6.....	1.35
9x4, 9x5, 9x6,	
9x8, 9.5x6.....	1.55
10x6, 10x7, 10x8....	1.75
11x6, 11x7,	
11x7.5, 11x9.....	1.95

## K Series:

12x6, 12x8.....	2.85
13x6, 13x8.....	3.85
14x6, 14x8.....	4.95
15x8, 15x10.....	5.45
16x6, 16x8.....	6.65

## Antique Series:

10x5.....	2.25
11x6.....	2.45
12x6.....	3.35
13x6.....	4.35
14x7.....	5.45
16x7.....	7.15

See your local hobby dealer  
for Master Airscrew  
propellers and accessories



Ingredients for the "classic" finishing method.  
Sig's and Randolph's dopes work beautifully;  
other brands may not perform as well.

nitrates for that. When I applied the first brush load of nitrate dope over the butyrate, I was prepared for disaster...but absolutely nothing bad happened!

After that, I experimented with Randolph's\* and Sig's nitrates and butyrate dopes. They're all compatible, and they can be mixed together in any proportion with no ill effects. That's logical, because the same thinner works equally well for all four dopes. And speaking of thinner, I use pure retarder now for all dope thinning. Retarder is a slow-drying solvent; using it instead of the standard fast-evaporating thinner has a few advantages: there's no "blushing" when you apply dope in humid conditions; you don't need as much dope because it doesn't vaporize quickly; and, best of all, thinning with pure retarder slows the dope's drying and allows brush marks to flow out so it looks almost as smooth as a sprayed finish.

For two reasons, I prefer Randolph's dope to Sig's, even though it's more expensive. Randolph's reds and yellows contain pigments instead of the dyes that Sig uses, and that saves a lot of time and weight. First, two brushed coats of Randolph's red provide a perfectly uniform, opaque finish. You can't achieve that with four applications of Sig's red! Second, Randolph's dope seems to be better plasticized. When the finish gets old (in 10 to 15 years) and its plasticizer loses flexibility, just apply a coat of Randolph's "rejuvenator," and the dope is as good as new again!

\*Here are the addresses of the companies mentioned in this article:  
**Sig Mfg. Co. Inc.**, 401-7S. Front St., Montezuma, IA 50171.  
**Randolph Products**; distributed by ABC Hobby Supplies, P.O. Box 2391, Clarksville, IN 47131.

## BETTER SAFE THAN SORE!



A few columns ago, I recommended a microballoon-epoxy mixture for making wing fillets and the like—not anymore!

Two weeks ago, I was sanding a microballoon fillet on a new model, and the tiny glass fragments in the resulting dust penetrated numerous skin pores, mostly on my left arm. I ended up with the worst case of "fiberglass itch" I've ever suffered—red, oozing, bleeding areas, one of them bigger than a dollar bill. I still haven't completely healed.

Glass particles can be mean stuff. My friend Emmett Fry nearly lost a hand recently, and he was incapacitated for weeks because fiberglass particles had entered his system through a minor skin lesion. In the '60s, a man I knew died because he was sandblasting with glass beads and not wearing the proper protective clothing.

From now on, I'm taking no chances. I've gotten rid of all the microballoons and fiberglass cloth in my model shop. Instead, for "fillet" purposes, I'll use baby powder; in lieu of fiberglass, I'll use Koverall. True, baby powder is about twice as heavy as microballoons, but it's easier to sand out smooth, and it sure smells good!



From now on, I'll stick to talcum for fillet filler; glass dust generated while sanding presents far too much of a hazard.

Windsor Propeller Co.  
3219 Monier Circle  
Rancho Cordova, CA 95742

**W**HAT'S THE BEST motor/propeller combination for your model? This frequently asked question is especially important for electric-powered models because they have a lower power-to-weight ratio than glow-powered craft. The Thrust Tester helps to determine the best motor/propeller combinations. (It can also be used for glow engines if you adapt the motor mount to accept the engine.)

Thrust-test measurements performed on a static test rig are useful as comparative data. Actual performance can only be observed during flight when the propeller is unloaded. Static prop testing is most useful when performed on lower-pitch props. High-pitch props (i.e., with a 1:1 diameter-to-pitch ratio) aren't working efficiently until the plane is moving quickly and the prop has unloaded.

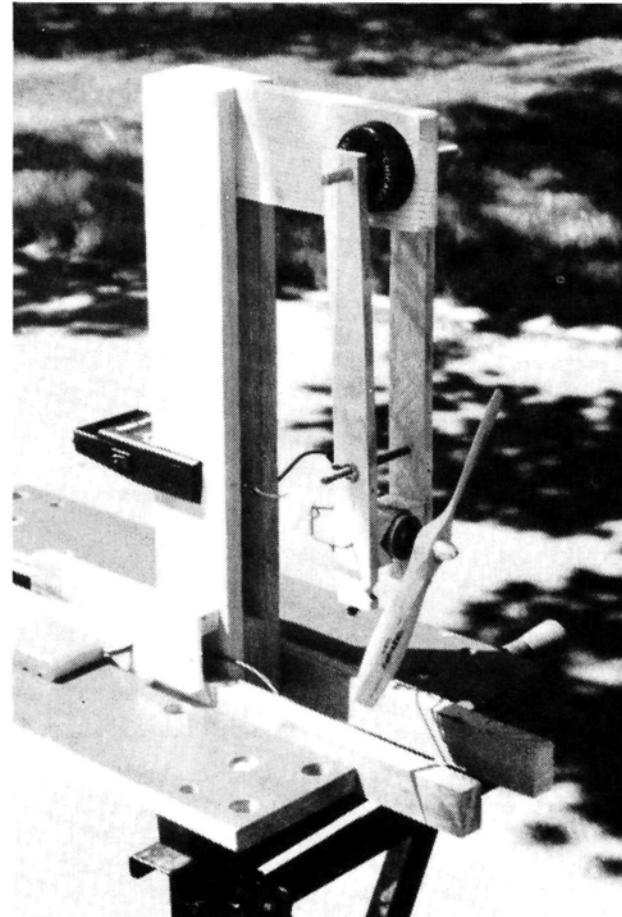
Most of the Thrust Tester's parts are wooden. It has a swinging pendulum that pivots from a ball-bearing roller-skate wheel, so there's very little friction, and it can be mounted in a vise or in a Black & Decker Workmate. The thrust measurements are displayed on a Normark\* Model 10 electronic digital scale that can measure up to 10 pounds. The amps are measured by a Davey 30A ammeter; the rpm can be taken from any standard tachometer. Just run your motor, and you can read the ounces of thrust, the amperage drawn and the rpm. This information enables you to compare various propellers without guessing or sacrificing efficiency.

I used the Thrust Tester to test props for a cowled electric model I'm building. For a cowled .035 Astro Cobalt motor with reduction gear, a Rev-Up 10x8 prop cropped to 9 inches performed the best, with minimum amps and maximum rpm. These determinations would be extremely difficult to make while flying, and this is why the Thrust Tester is very helpful.

#### **CONSTRUCTION**

Don't worry if you can't get the exact measurements that are indicated on the drawings. Wood at lumber stores has

**"THIS INFORMATION ENABLES  
YOU TO COMPARE VARIOUS  
PROPELLERS WITHOUT GUESSING  
OR SACRIFICING EFFICIENCY."**



#### **Measure low-pitch prop efficiency**

*The Thrust Tester uses a swinging pendulum that pivots from a ball-bearing roller-skate wheel. It's nearly frictionless.*

## **Make — a Static · · · Thrust Tester**

by JOE BESHAR

designations that are industry standards, e.g., the 1-inch-thick wood that I refer to actually measures  $\frac{3}{4}$  inch.

To make the cross-member, drill a

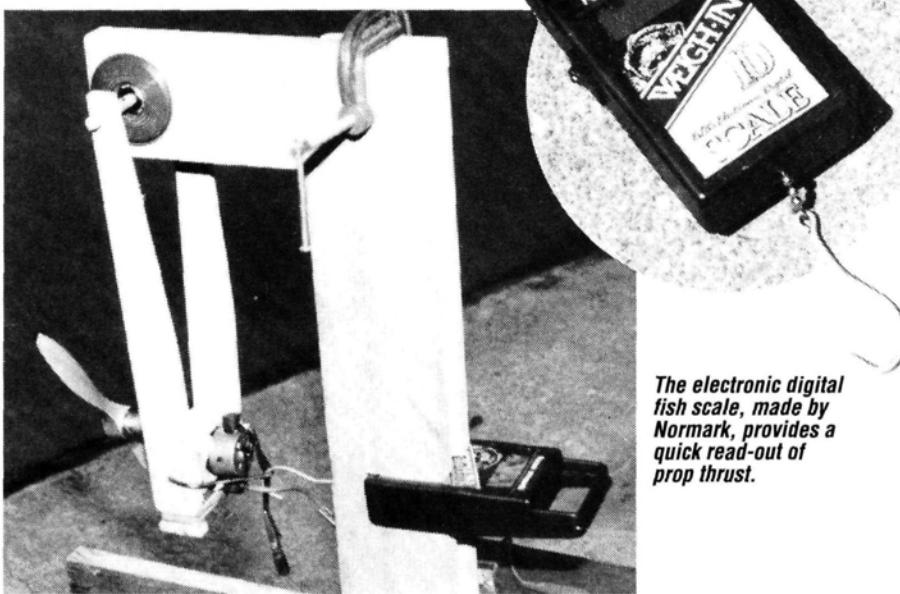
$2\frac{1}{4}$ -inch hole in a  $1 \times 3 \times 10$ -inch piece of wood. The hole should accommodate the roller-skate wheel, which

has a  $2\frac{1}{4}$ -inch o.d. with a  $\frac{5}{16}$ -inch bearing i.d. (standard dimensions for roller-skate wheels). I wrapped masking tape around the wheel's circumference before I inserted it into the hole. This provided a nice fit, and I didn't have to glue it to the cross-member.

Use  $1 \times 3$ -inch wood for the two vertical pieces (see dimensions in the de-

tailed drawing). To make a swing member arm (you'll need two), drill a  $\frac{5}{16}$ -inch hole in a piece of plywood that measures  $\frac{3}{8} \times 1\frac{1}{2} \times 12$  inches. The hole should be large enough for the  $\frac{5}{16} \times 5$ -inch dowel that will be the axle. Drill a  $\frac{1}{4}$ -inch hole to accept the threaded rod, and a  $\frac{1}{8}$ -inch hole to accept the hitch. All the holes should be located as indicated in the diagram.

To bend the hitch, use ordinary coat-hanger wire (the standard diameter is about .091 inch). The hitch detailed in the diagram is sized for a .05 or .035 Astro Flight Cobalt motor (its  $2\frac{3}{4}$ -inch dimension suits this motor). The size of the spacer bushings between the roller-skate wheel bearing and the swing members will also vary



*The electronic digital fish scale, made by Normark, provides a quick read-out of prop thrust.*

depending on the motor.

Build the base with two pieces of wood that measure  $1 \times 1\frac{1}{2} \times 21$  inches, and cut the spacer block from a piece of 1x3-inch wood.

## ASSEMBLY

Please refer to the assembly drawing for each step. Assemble the base, the vertical pieces and the cross-member using white glue and  $3\frac{1}{2}$ -inch wood screws. Run the  $\frac{5}{16}$ -inch dowel through the roller-skate

wheel with the spacer bushings on either side. Glue the wedge blocks to their respective locations on the swing members, then install the  $\frac{1}{4}$ -inch threaded rod and the wing nuts. Insert the hitch into the two  $\frac{1}{8}$ -inch holes, and mount the ammeter and the scale. Then, place the scale's hook over the hitch, and the Thrust Tester is complete.

Run 14-gauge wire from the battery pack's positive terminal to the ammeter.

(Continued on page 112)

## EQUIPMENT

Normark Model 10 scale

Davey 30A ammeter

Standard tachometer

## WOOD

1— $1 \times 3 \times 10$ -inch-piece  
(cross member)

1— $1 \times 3$ -inch-piece (spacer block)

2— $1 \times 3 \times 20$ -inch-pieces  
(vertical member)

2— $\frac{3}{8} \times 1\frac{1}{2} \times 12$ -inch-pieces  
(plywood)(swing member)

2— $1 \times 1\frac{1}{2} \times 21$ -inch-pieces  
(base member)

4— $\frac{3}{4} \times 3 \times 4 \times 1\frac{1}{2}$ -inch,  $45^\circ$  corner  
moldings (wedge block)

## OTHER

1 roller skate wheel

1— $\frac{5}{16} \times 5$ -inch dowel

1— $\frac{1}{4}$ -inch threaded rod

2 wing nuts

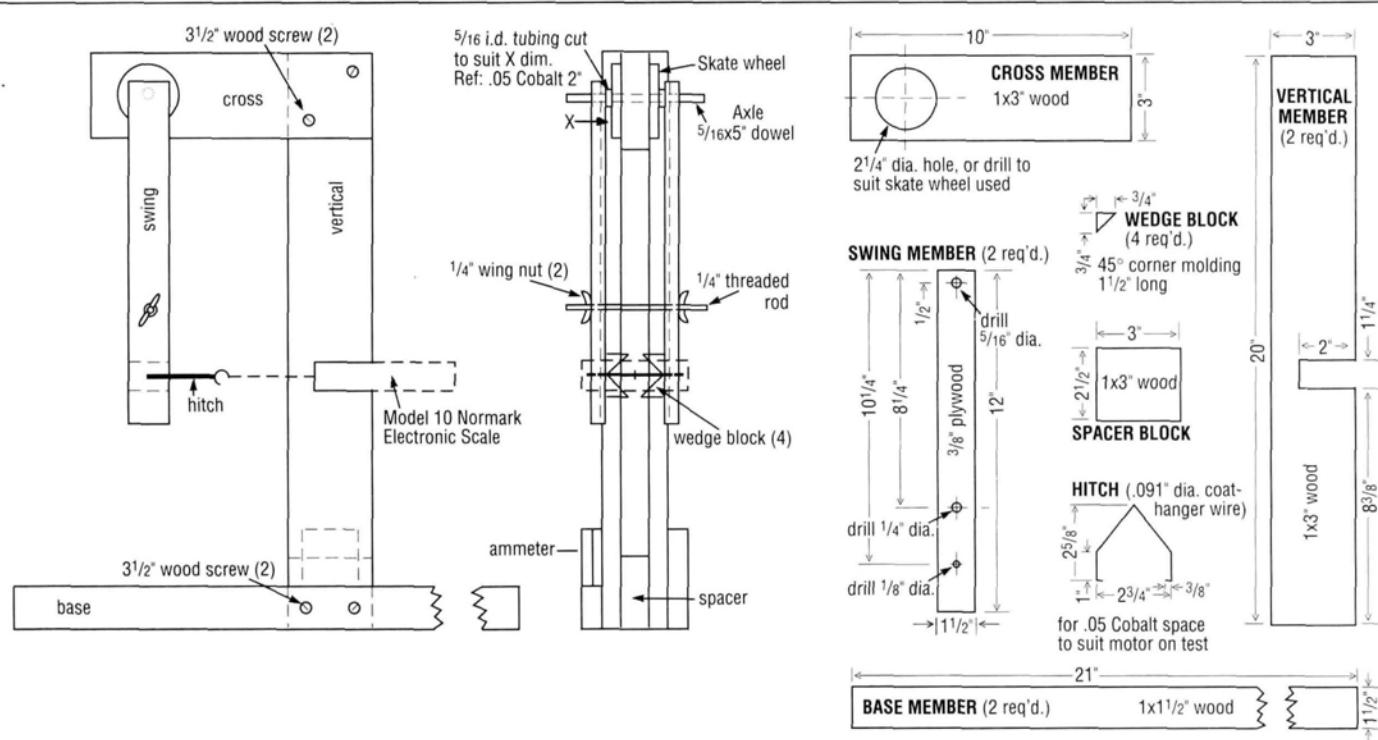
4— $3\frac{1}{2}$ -inch wood screws

coat hanger wire

masking tape

spacer bushings

white glue







M I D W E S T

# P-51



by DAVE WINDOM

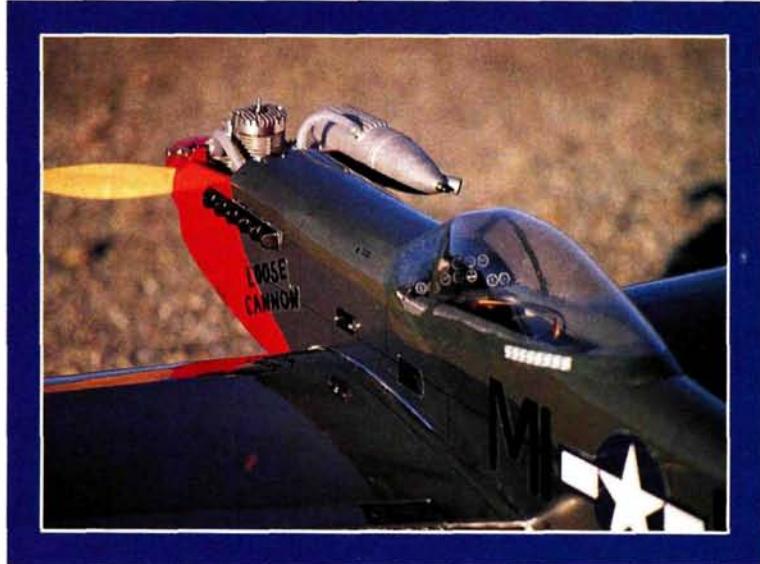
I TOOK A POLL that asked, "What's the number-one, classic warbird of all time?" the P-51 Mustang would surely rate as top dog. It's easy to understand why the P-51 is so popular: it served in all theaters of WW II, and it was used in several nations' air forces well into the '50s. Its smooth, clean lines and deadly appearance also make it one of the most popular warbird models.

I've heard it said that P-51s are like Cubs and bellybuttons; everybody's got one! Mustang models have appeared in many sizes, from super-scale to stand-in-the-next-county-and-squint scale. The 1990 Scale Masters

# Mild-mannered Mustang



Champion flew a 1/5-scale version. Midwest Products\* recently added a P-51 to its Success Series models, which include the ever-popular Hots kits. The P-51 kit isn't for beginners, but if you've had some experience, you'll be able to build and fly it successfully. Although this Mustang isn't a scale replica of the venerable P-51, it resembles the full-scale version enough to make it easily recognizable, and it doesn't look like a box.



PHOTOS BY BRENDA & DAVE WINDOM



## THE KIT

After I opened the box, thumbed through the instructions and examined the plans, my first thought was, "Boy, is this going to be fun!" The 35-page construction manual has Midwest's customer-service number on its cover. The single sheet of plans comes rolled instead of folded (something I appreciate), and most of the balsa and the hardware are packaged in plastic

quickly. The ribs didn't have the part numbers stamped on them, so I had to match them to the plan. This is a minor problem, though, and it didn't slow down my progress very much.

For the best flight performance, it's critical that the wing have the proper amount of washout, and the manual and the supplemental instruction sheet cover this



*The parts come organized in plastic bags. The high-quality wood has excellent die-cutting.*

bags. The balsa is very light—almost contest grade—and the die-cutting is crisp and clean. The Micro-Cut lite-ply is also cut very cleanly, and it features a tab-lock construction.

## CONSTRUCTION

First, build the wing, which has the standard D-tube construction with die-cut, leading-edge sheeting and capstrips. There are very few parts, so construction goes fairly

quickly. The ribs didn't have the part numbers stamped on them, so I had to match them to the plan. This is a minor problem, though, and it didn't slow down my progress very much.

For the best flight performance, it's critical that the wing have the proper amount of washout, and the manual and the supplemental instruction sheet cover this

subject extensively. Build the wing over the included alignment jig; the kit also includes incidence gauges that slip over the wing tips. This is the easiest method I've ever used to set washout. I double-checked the settings with my Robart\* incidence meter, and they were dead on.

After you've fiberglassed the wing's center section, start work on the fuselage. It

## SPECIFICATIONS

MIDWEST **P-51**

**Type:** Sport/scale

**Wingspan:** 54 inches

**Weight:** 5 pounds

**Wing Area:** 521 square inches

**Wing Loading:** 22.2 ounces/square foot

**Power Req'd:** .35 to .45

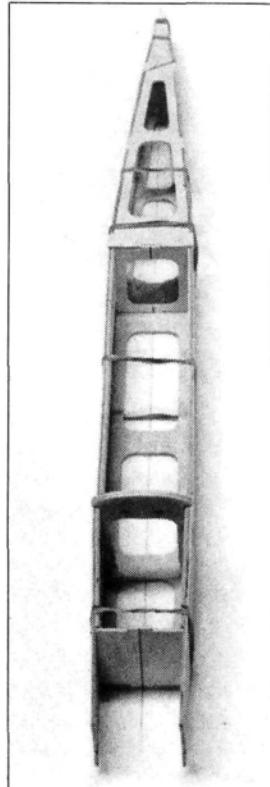
2-stroke; .46 to .50 4-stroke

**No. of Channels Req'd:** four (elevator, ailerons, rudder and engine)

**Sug. Retail Price:** \$70

**Features:** high-grade balsa with excellent die-cutting; 35-page instruction manual; rolled plans; tab-lock construction; wood and hardware come organized in plastic bags.

**Comments:** the Midwest Mustang is fun to build and fly. The included wing jig makes it a breeze to build-in the wing washout. The die-cutting is so good that the parts fall out in the box, and it takes time to identify them.



*Build the fuselage over a 36-inch line that you draw on your workbench. Join the fuselage parts while you align them over the mark, and then glue them together.*

consists of die-cut lite-ply with balsa blocks and a built-up turtle deck that gives the Mustang its distinguished lines. The plans don't have a top view, but you don't really need one. Draw reference lines on two of the formers, and then align them with a 36-inch line that you've drawn on your workbench. The fuselage's parts tab-lock together, so I assembled the fuselage box, secured it with rubber bands, aligned it with the reference line and glued the seams with medium CA.

The kit provides parts for 2-stroke and 4-stroke engine installation, and both versions are shown on the plans. My Royal\* engine and engine mount didn't fit either version, so I added

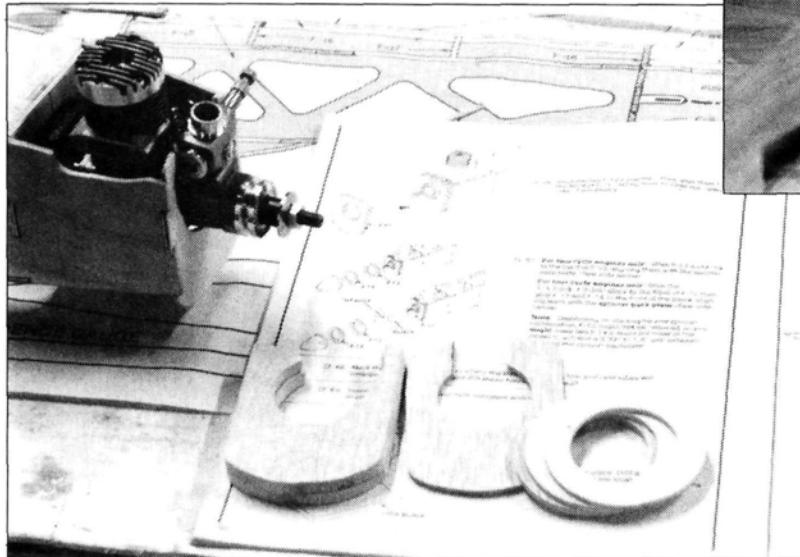
**"With the power at full, this Mustang tracks really well and flies much like a Quickie 500 pylon racer—fast and stable."**



# P-51

some balsa spacers behind the nose ring to make them fit. I mounted the engine and the spinner, and I sanded the

when I built the wing and the fuselage. The die-cutting was so good that some of the parts fell out of their sheet



nose to shape.

You have to cover the formers for the fuselage turtle deck with  $\frac{1}{8}$ -inch planks. This seemed cumbersome, but once I got started, the work progressed quickly. It's best to bevel the edges of the planks with a T-bar and 60-grit sandpaper so that they fit together snugly. I glued the planks in place with medium CA, and I edge-glued them together with Titebond wood glue because it's easy to sand when it's dry.

I only had one problem

stock. Although some were taped in place (my thanks to the person who packed the kit!), I had to match most of the parts to the plan to identify them, and this was time consuming. As I mentioned earlier, the part numbers should be marked or stamped on the parts.

It only takes a few minutes to glue the die-cut tail surfaces together and sand them to shape. I cut the slot for the tail-wheel bracket using the large cut-off disk on my Dremel\* tool—a neat installation.

## COVERING

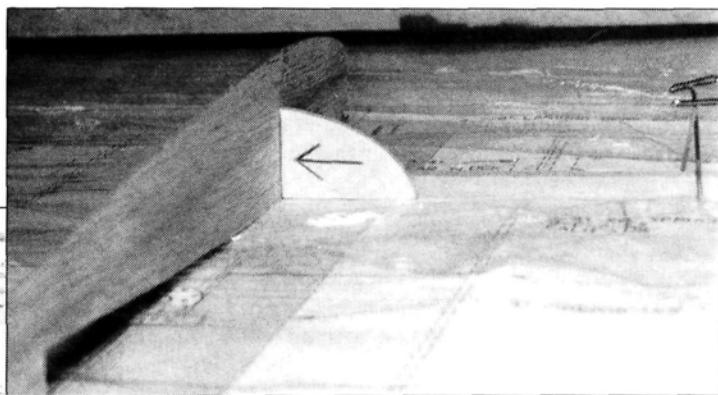
I covered the Mustang using the color scheme that appears on the box so that I

knapweed, which tends to tear the lower wing panels out of low-wing aircraft. To

**"A .45-size engine provides more horsepower than it needs, and its vertical performance is literally out of sight."**

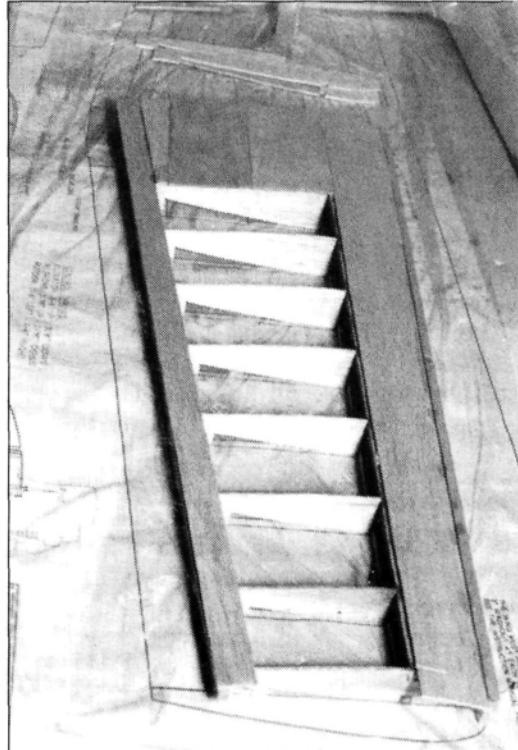
could use the nifty kit-supplied decals. My runway is surrounded by sabertooth

protect these surfaces, I covered them with Coverite's\* Mica-Film

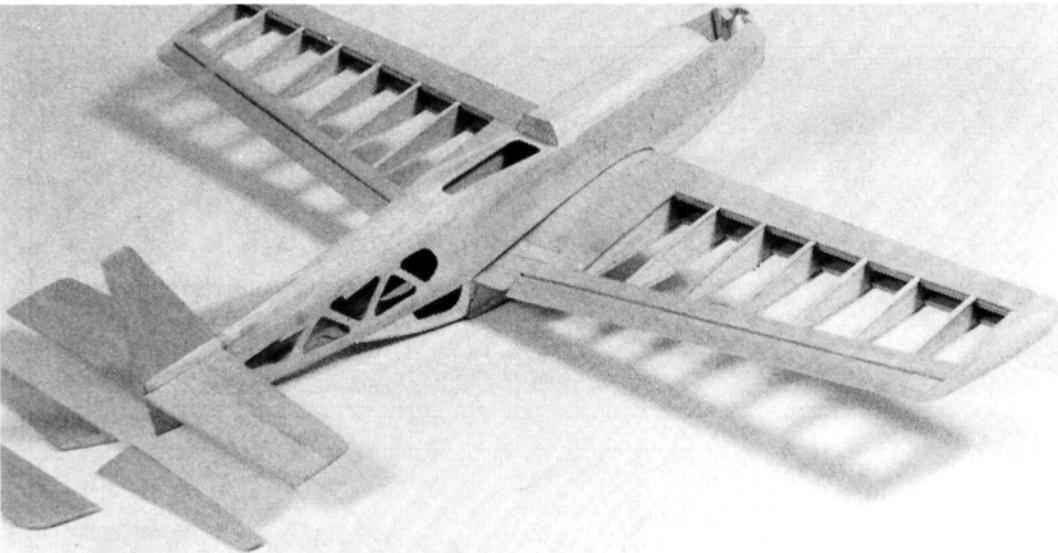


Above: the kit includes a variety of gauges and jigs to ensure that you'll build the model correctly. This handy piece is used to set the dihedral angle.

Left: the supplied spacers and shims make it possible to use a variety of engines in the Mustang.



The wing has the typical D-tube construction, which makes it very light, yet strong.



aluminum covering. It's durable, and it looks very realistic. I also drew some panel lines with a fine-point drafting pen. I covered the upper wing surface with olive-drab MonoKote\*.

I've covered all my pylon racers with Micafilm because it offers a couple of advantages. To apply it, you only use adhesive where it's needed, and this saves weight. Micafilm is also very tough. If you crash a plane that's covered with it, you'll have a handy sack in which to carry home the parts; the airframe will break before the covering will tear!

The key to using this product is planning. You must know where the seams will be. It's also extremely important to stretch the film for all it's worth. Be sure to hold it in place while the adhesive cools, and then use an iron to shrink it.

The kit lets you choose your hinging method, so I opted for Radio South\* CA hinges. I've used them on almost everything I've built, and they've never broken or come undone, even in sub-zero temperatures. (Yes, we fly all year long here in Montana; it just takes some getting used to!)

## AT THE FIELD

The Mustang immediately attracted a lot of attention at the field. Modelers and

spectators were impressed by its good looks, and many of them identified it as a P-51 right away.

After a couple of tanks of fuel had been run through the new Royal, it was time for the plane's first flight. I advanced the throttle a little too quickly, and the plane was airborne sooner than I had expected. I also discovered that I had inadvertently set my dual rates on high,

performance is literally out of sight. I flew at half throttle for most of the first flights and for all of the

**"Rolls are quick, and loops are as big as you want."**

passes for the camera. After the first pass, my cameraman, Steve, hollered, "Now try a slow pass." I yelled, "That was one."

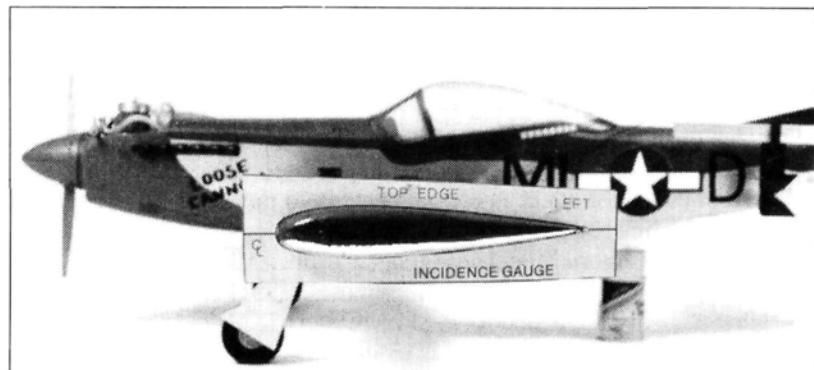
With the camera work

racer—fast and stable. Takeoffs at full throttle resulted in takeoff rolls of about 6 feet. With slightly less power, it flies like any good, lightweight, sport plane. Best of all, the P-51 lines make it look fantastic.

I had to practice a little to get the landings right. This airplane doesn't have much frontal area, and it takes a while to slow it down. When the landing flare has started, don't neutralize the elevator. Hold the stick back until the Mustang touches down and

enough of its speed has been bled off for a comfortable turnaround and taxi back to the pit. Be careful not to slow the plane down too much. Its landing gear is

*These incidence gauges slip over the wing tips. Twist the wing until the top edge of the gauge is aligned with the model's thrust line. To set the incidence, hold the wing in position and iron out the wrinkles.*



and I had to fly the Mustang all over the sky trying to get it under control. A couple of "switch-flips" later, and the Mustang was trimmed properly and behaving well. So much for trying not to get gray hair! The recommended control throws are right on; use them.

The Midwest Mustang is a rootin', tootin' airplane. A .45-size engine provides more horsepower than it needs, and its vertical

completed, I punched the power up to full and headed upstairs to play. Rolls are quick, and loops are as big as you want. My favorite maneuver is a long diving pass: I level out the plane at 10 feet off the deck; I let it shoot down the length of the runway; and I finish with climbing vertical rolls back to altitude. With the power at full, this Mustang tracks really well and flies much like a Quickie 500 pylon

close to its CG, and if you don't hold the elevator pressure until the plane has completed a roll-out, it will nose-over.

Midwest's Mustang P-51 is a pleasure to build and a real kick to fly. It's also simple and inexpensive: a sport .40 will pull it; a standard 4-channel radio will control it. The quality of the kit is very good, and it's certainly a good value for your modeling dollars.

(Continued on page 112)

# SMALL STEPS

## GOLDEN OLDIES, TANKS AND THE G-MARK TWIN

by RANDY RANDOLPH

**B**ACK IN THE early '30s *Modern Mechanics* magazine offered to buy and print the plans for a light, inexpensive, easy-to-build, two-place airplane. One designer/builder (a farmer turned mechanic) delivered his plans by flying his air-

the benefits of small airplanes, and it's still racking up the numbers. The thing isn't particularly pretty (neither was the Air Camper!), but it has an appeal and a "flyability" that are second to none. Old Bernie would be proud.

Few of the kits for  $\frac{1}{2}$ A R/C airplanes have stood the test of time. Other than

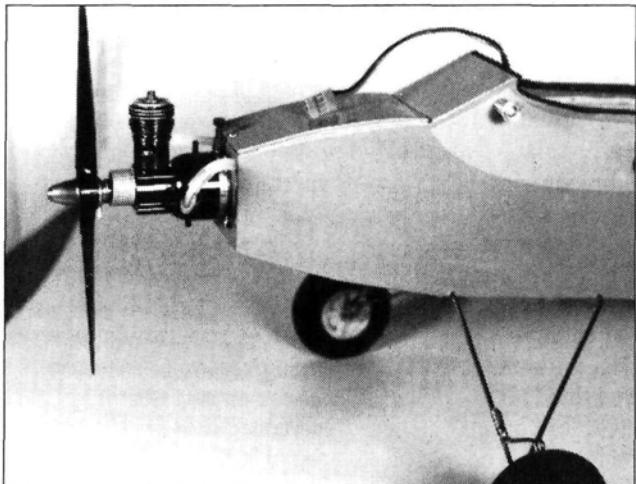


The Q-Tee is one of the most popular and enduring  $\frac{1}{2}$ A R/C kits around. George Springer's is a good example.

plane to an airport near the magazine's editorial office so that the editor could examine the finished product. Powered by a Ford Model-T engine, it was a high-wing parasol design, and it flew two people quite respectably. The editor was so impressed that he made a deal on the spot, and Bernie Pietenpol chugged into aviation history with his Air Camper. It became, and still is, a very popular home-built airplane that allows many people to have their own aircraft.

Although it's not to scale, the Airtronics Q-Tee does bear a remarkable resemblance to the Air Camper. It has introduced thousands of modelers to

the Q-Tee, Ace's Wizzard and Dynaflite's Piece O' Cake are two that come to mind. Probably the most popular airplanes built from magazine plans are the Showmaster (*RCM*) and the Twiliter (*Model Airplane News*). Building these air-



John Vasey added an external tank to the Cox Black Widow on his Nickel.

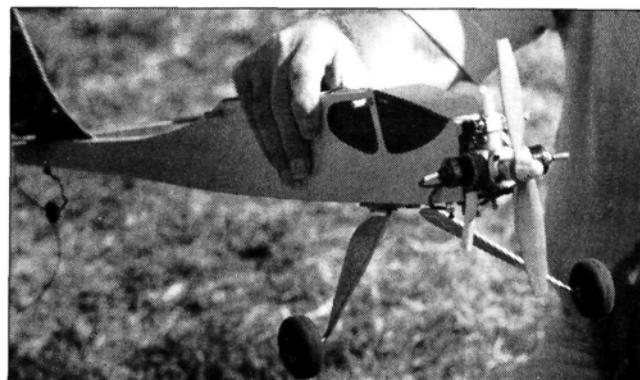
planes requires a little effort, but the finished products reflect pride in ownership and fly well.

One problem with .049-powered airplanes that use engines such as the Golden Bee, Baby Bee, Black Widow and Dragonfly is the short run time allowed by the built-in tanks. It's nice to have a complete power package, but it would be nice to have a bigger tank, too. Over the years, a variety of ways to increase fuel

capacity have been tried:

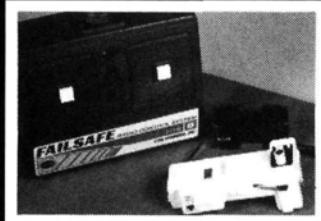
Joe Wagner seals one of the vents and uses the original tank as a header, allowing the engine to draw fuel through it (by way of the filler tube) from a vented external tank. That works well. John Vasey drills through the original tank and connects the external fuel line directly to the tank's fuel line. At one time, Cox offered a plastic mount with a built-in needle valve that allowed an external fuel line to be attached directly to the fuel intake. That worked better than anything. That little device may not be available anymore, so if you see a side-mounted engine in a plastic U-control airplane at a garage sale, buy it!

A word or two about the new hot .10 to .12 engines. The O.S. CZ series includes two .12s for race cars; they won't work in airplanes because of the design of their



The G-Mark Twin .12 is an impressive sight on any airplane. Tom Day's installation shows it off to good advantage.

## NEW SINGLE-CHANNEL



**C**ox's new, single-channel radio will sell for about \$50. The receiver, switch and microservo are all in one small package and should be just the thing for .01- to .02-powered airplanes, or for sailplanes. The transmitter is equipped with left and right push-buttons instead of a stick. Although you may be pressing the buttons, as a safeguard against spiral dives the servo returns to neutral after just a couple of seconds. As evidenced by the trim control, the servo is fully proportional; in fact, it seems that you could fly your airplane with this radio by using the trim control alone!

heads. (At one time, O.S. produced one for aircraft; it was actually included in a kit in lieu of an electric motor.) If there's a head available that would enable us to convert a car engine to aircraft use, you'll read about it here!

While on the subject of .10s etc., the G-Mark twin is an impressive engine. It may not spin a propeller as fast as the hot jobs, but it has plenty of power and is unique. In the installation shown, both plugs are attached to a single post under the engine, and the case is grounded to the adjacent post. Both plugs are simultaneously heated by a single battery that's connected to the two posts. The exhaust extensions add a nice touch and help to keep the exhaust residue away from the plug connections. ■

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Wingspan: 60" Wing Area: 552 sq. in. Flying Weight: 5-5½ lbs.  
Radio: 4 Channel Motor Range: 35 - 45 2-Stroke, 40 - 50 4-Stroke Kit #172

Coming  
August, 1991



Also Available in .60 size

Wingspan: 54" Wing Area: 521 sq. in. Flying Weight: 5-5½ lbs.  
Radio: 4 Channel Motor Range: 35 - 45 2-Stroke, 40 - 50 4-Stroke Kit #170



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Radio: 4 Channel Motor Range: 35 - 45 2-Stroke, 40 - 50 4-Stroke Kit #171

*Fly a dawn patrol with any of these low-wing taildraggers that are easy to fly. Our series of Fun-Scale™ Class Warbirds provide forgiving handling combined with maneuverability, so you'll enjoy learning to fly a taildragger.*

*Our Micro-Cut Quality wood components, Success Series Construction Manual and computer-drawn plans leave no room for questions. Building is speedy due to the jig-lock fuselage, D-tube wing construction, and all sheet tail surfaces.*

*Slip "the surly bonds of earth" with these classic warbirds. Visit your local hobby shop today and ask for the Midwest Fun Scale Class Warbirds!*

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# SPORTY SCALE

## TECHNIQUES

by FRANK TIANO

### Basic books, plans and products

**I**N RESPONSE to letters I've received from some of you requesting more beginner-oriented material, I feel I must make a blanket explanation and, possibly, an apology. I never intended this column to deal with the aspects of starting out in scale modeling, but rather to deal with the very special products, techniques and materials a scale modeler might need or simply want to use on a new project. If, however, you go back over the issues from the last couple of years, you'll find plenty of "how-to" articles on scale-modeling techniques. Possibly the information you seek is in these older issues. In the mean-



*The Transmitter Tote protects any transmitter. Even if you drop the case, you won't hurt the contents.*

time, please don't be discouraged; most experienced scale modelers will be glad to help you whenever they can. For those of you who have just discovered *Model Airplane News* and "Sporty Scale," let me see if we can get you started in the right direction.

#### SCALE STAPLES

**T**o build an effective scale model, for competition, fly-ins, or just your own satisfaction, you'll need several things in addition to a place to build and a selection of wood, tools and adhesives. My suggestion is that you purchase a few books on scale modeling and modeling techniques. An excellent choice is the very popular "Scale in Hand" by the old master, Dave Platt. This book is available for a few bucks from R.C.M. Publications, and it deals with many aspects of scale modeling. Next is the selection of books from *Model Airplane News*, especially "400 Great

Modeling Tips" and "Control Systems." Other books on aircraft of all types may be found in Zenith Aviation's\* or Historic

Bob Holman's Plans\*. Remember, once you've selected a three-view, don't change unless you're fully prepared to change the model accordingly! Some of these books take you by your little glue-encrusted hand from start to finish. Certainly they devote tons more space to specific scale modeling questions than I could in this little column each month!

#### TRIPES A'MIGHTY

**B**y now, most of you have heard that the Ziroli DR-I Triplane is an excellent



*Bob Hanft—a former USA FAI-scale team member—poses with his DR-I built from a Glen Torrence kit. Big enough runway, Bob?*



*Missed Top Gun? Don't miss your chance to get a leftover program for \$3—a collectors item.*

Aviation's\* catalogue. Last, but certainly not least, there are several major sources of scale three-view drawings, plans and pictures, e.g., Jim Pepino's Scale Plans & Photo Service\*, Bob Banks's Scale Model Research\* and

performer and pretty easy to build. Go to any scale fun fly on any given day, and you're bound to see at least one of the three-winged craft. I suspect that the success of Mr. Ziroli's stand-

*(Continued on page 70)*

## SPORTY SCALE

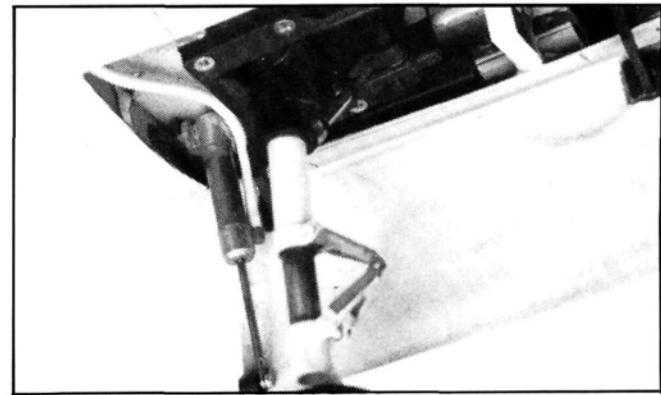
(Continued from page 69)

off version may have sparked Glen Torrence Models\* (GTM) to produce an exact scale rendition in 1/4 scale. Glen's prototype was flown at Top Gun '91 by Bob Hanft, and I think Bob proved once and for all that a triplane does *not* have to land on its nose every time it smells dirt! For those interested, GTM's Tripe kit is very, very complete. It even includes two sets of plans and over 275 hard-to-make, unique parts. All-up weight is under 15 pounds, and there are "skatey-eight" different engines you can power the thing with. Bob used an O.S. 160 on the prototype, but that large cowl will accept anything up to a rotary engine out of your neighbor's shiny red Mazda! Look for the DR I in September, and look for a price tag of around \$400 to \$450. By the way, Glen is one of the partners that produced that fabulous Top Gun program that everybody has been talking about. If you haven't seen one yet, let me tell ya, this is probably the best effort I've ever seen in a modeling program, period! Almost every com-

petitor is featured, along with biographical data and a picture of their scale aircraft. Glen is selling the leftover programs for only 3 bucks, and that includes postage anywhere in the U.S. or Canada. If you couldn't make Top Gun this year, here's your chance to grab a little of the action in literary form.

### GOODY WAGON

Every once in a while a product comes along that I feel would make a perfect addition to any modeler's inventory of must-have stuff. The Transmitter Tote offered by Innovative Designs\* of Oregon is one of these products. This tote is a 100-percent nylon, zippered case that features a full 1 1/2 inches of foam padding all around the inside that will protect any transmitter. The case has double handles and a clear plastic pocket for your name and the type of transmitter you're carrying. I have several transmitter carrying cases, but this tote is the lightest, most convenient one I have. And it's compact, too, measuring just



There are many uses for the new BVM air cylinder—in this case, it's used to shut the large nose-wheel door in an F-16 model.

11.5x12x6.5 inches. If you'd like one, give your hobby dealer Innovative Design's address, and owner Jim Harman will be happy to provide the dealer with more information.

### THE COLOR PURPLE

It seems that every couple of months Bob Violet Models\* (BVM) releases some more neat scale stuff that we've always wanted but didn't know it! This month they've got four new items to make our scale-modeling chores less difficult. The first item is a package of strut door attachment parts (no. 5552) that allow us to easily attach light poly ply

(fiberglass) or plywood landing-gear doors to the landing-gear strut. These carbon-fiber, molded parts come with simple directions that even your dog can understand! Next is no. 5735; a throttle-linkage part that allows you to easily remove your throttle pushrod from inside a ducted-fan shroud; or from any other place where it may be extra hard to get at; or when you want to remove your engine, but you don't want to lose that critical pushrod adjustment when you reinstall it. Then we have the soon-to-be-famous and long-overdue BVM 2-56 steel couplers. Scale modelers put lots of stress on untold components and, more than once, we've had a light, brass-threaded coupler simply break off or fail in some other way. Well, here's the fix! These steel couplers won't break, but they require silver soldering for installation. Ask for part no. 5734. The last of the new releases is the very special, small, retracting air cylinder that can be used for closing inner wheel doors on a WW II fighter, or exterior doors on modern jet fighters like the BVM F-16. I've just found another use for these



Bob Curry's Fokker DR-I triplane was built from Ziroli plans. The weathered finish was done with a large paint brush.

tiny cylinders—they're great for closing a sliding canopy—gear up, and the canopy closes! Oh yeah, before I forget, I just saw the new T-33, and it's worth the wait!

### TIM'S WHIMS

Once again, the very prolific Tim Farrell, who now lives in Lubbock, TX, has succeeded in astounding your author. In as little time as you could sing a few stanzas of the national anthem, Tim has come up with a beautiful, scratch-built Bristol Beaufighter.



**Fixed gear, no flaps and simple construction are the secrets of Tim Farrell's success. The Bristol Beaufighter has a 68-inch wingspan; it weighs 6½ pounds; and it uses two O.S. 26 4-stroke Surpass engines.**

This is just one example of stand-off scale at work. The B'fighter is all balsa with appropriate plywood reinforcements, and it features fixed landing gear and commercially available cowls. In fact, the cowls were purchased at a local Walmart store in the kitchen department. That's right, they're small cooking pots with their handles removed! Timmy is getting really good at this twin stuff. So far, his Black Widow, F-82 and P-38 have all flown extremely well. And if this excites you a little, wait until next month and get a load of his Pseudo fighter, a slick-looking twin that just might create a few hundred phone calls for plans from the elusive Dr. Farrell!

Another month has gone by,

and we're slowly coming up to the building season once again. Remember that we must keep others in our households in good spirits during this most celebrated season. This means that we carefully wipe off all that epoxy from our hands before we grab that new brass doorknob; we refrain from doing just "one more gluing job" minutes before departing on a dinner date, while dressed in our cleanest, lightest colored suit; and, of course, we remember that most of the paints we use in our sport most certainly will stain the stark white porcelain

sink and that really isn't the proper place to dispose of that stuff, in the first place! Oh sure, there's lots more to be concerned about, but this should get you started. Meanwhile, don't forget to check your six.

\*Here are the addresses that are pertinent to this article:

**Zenith Aviation Books, P.O. Box 1, Osceola, WI 54020.**

**Historic Aviation, 1401 M Kings Wood Rd., Eagan, MN 55122.**

**Scale Plans & Photo Service, 3209 Madison Ave., Greensboro, NC 27403.**

**Scale Model Research, 2334 Ticonderoga Way, Costa Mesa, CA 92626.**

**Bob Holman Plans, P.O. Box 741, San Bernardino, CA 92402.**

**Glen Torrence Models, (Top Gun Programs), 2981 Vail Valley Ct., Snellville, GA 30278.**

**Innovative Design, P.O. Box 1733, Rogue River, OR 97537.**

**Bob Violett Models, 1373 Citrus Road, Winter Springs, FL 32708.**

## Z METER WINDSURFER



Sheeted and cap stripwings, flatbottom with wash out. Plug-in wings for easy transportation. Plug-in and flying stab, canopy, are just a few of the features of the windsurfer.

Wing Span: 78 ½ in. Length: 42 ½ in.  
Wing Area: 544 sq. in. Airfoil: Flat Bottom Highlift

## WINDSURFER 100

Wing Span: 98 ½ in. Length: 45 in.  
Wing Area: 790 sq. in. Airfoil: Modified 205

## EZ-1 GLIDERS



Wing Span: 78 ¼ in. Est. Flying Wt.: 26 ounces  
Wing Area: 544 sq. in. Airfoil: Modified 205

## EZ-2 "100"

A larger version of the EZ-1, easy building with turbulator spars, an open class glider that can perform with the best of them. Plug-in wings for easy transportation. Stress for high-starts.

Wing Span: 98 ½ in. Est. Flying Wt.: 45 ounces  
Wing Area: 790 sq. in. Airfoil: Modified 205

## TERCEL

### GRENADE-LAUNCHED



Wing Span: 50 ½ in. Flying Weight: 11 ½ ounces  
Wing Area: 275 sq. in. Airfoil: Modified 205  
Length: 31 ¼ in.



Wing Span: 50 ¼ in. Est. Flying Wt.: 11 ½ ounces  
Wing Area: 270 sq. in. Airfoil: Modified 205

## KASTAWAY



Wing Span: 59 inches  
Wing Area: 380 square inches  
Est. Flying Weight: 15 ounces  
Airfoil: Modified 205

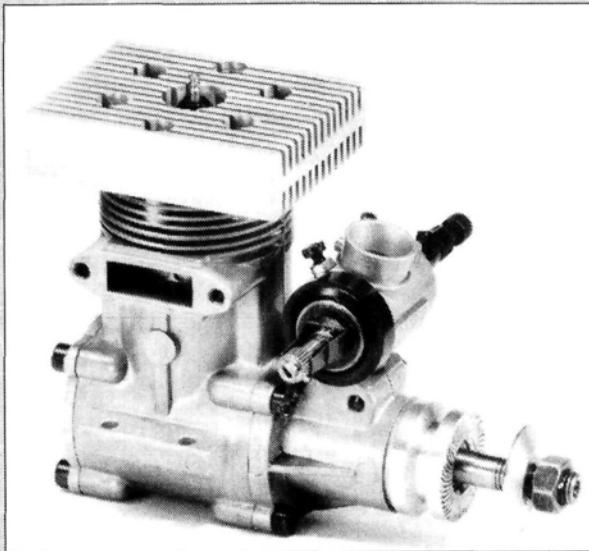


**BRIDI AIRCRAFT DESIGNS, INC.**  
23625 Pineforest Lane  
Harbor City, California 90710

**(213) 326-5013 549-8264**

# ENGINE EVALUATION

by MIKE BILLINTON



*The carburetor has a rubber seal around the throttle barrel, a solid spigot-mount and firm, predictable, twin-needle fuel controls. With the really good piston seal, you don't need too much more.*

1.08cu.in.), and this 12cc version shares many features with others in the range: front induction, Schnuerle-ported ABC liner/piston setup (with exemplary hot and cold piston fit owing to the quality of the metal used in this vital area).

The only major structural differences between the ASP 61 ABC engine and the ASP 75 are:

- Bore has been enlarged by approximately 20 percent (.090 inch) to 2.6mm.
- Effective compression ratio has been increased from 8:1 to 12:1 (in round numbers).
- Piston weight is greater by 33 percent (!)—from .45 ounce to .60 ounce.

As you'd expect, the combination of the first two design changes has led to considerably enhanced torque levels (by as much as 33 percent), while the increased reciprocating weight of the remarkably solid piston somewhat restrains rpm and horsepower maxima. (Helicopters need more heat-sink capacity because they're less cooled by airflow than fixed-wing aircraft are.)

Like other bored-out engines, the ASP 75's torque/weight ratio is

**B**ASED ON THE ASP 61 ABC engine, which is a strong performer for fixed-wing airplanes, the ASP 75 is a bored-out, well "over-square" helicopter engine. Its 12cc capacity is 20 percent larger than the ASP 61's, so it's outside the range of the usual 10cc competition classes. It's designed for .61 sports helis that need a power boost to cope with their weight or some other load.

Heli pilots often hesitate to add more nitro and/or a tuned pipe because of the increase in heat that results. True, the problem is soluble, but an alternative for sports fliers is an engine with a greater capacity. For this reason, the ASP 75 might be just what they need.

ASP's burgeoning range now includes 21 models in eight capacities ranging from 3<sup>1</sup>/<sub>2</sub>cc to 17<sup>1</sup>/<sub>2</sub>cc (.21 to

TABLE 1

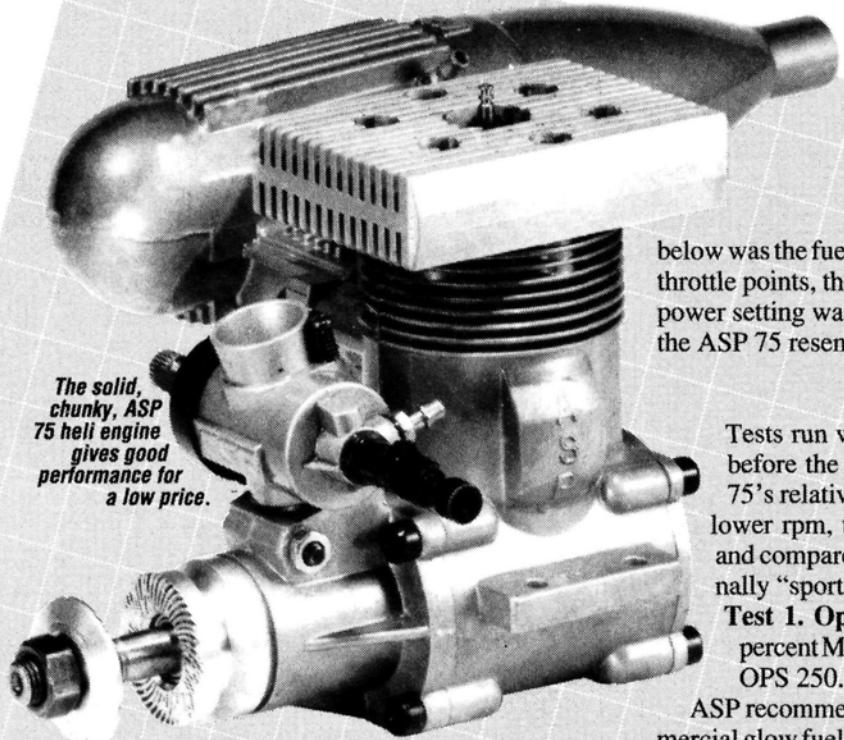
## Torque/weight ratio

Units are oz.ins/lb.

Enya R120 4-stroke .....	108
S. Tigre 2000 .....	91
Irvine 40 .....	102
Irvine 46 .....	124*
S. Tigre 60cc twin .....	143
OPS 60cc twin .....	121
Super Tartan 20cc .....	95
Saito 65 4-stroke .....	100
Saito 80 4-stroke .....	122*
Kawasaki TA51cc .....	82
Super Tartan 44cc twin .....	125
YS 129 4-stroke .....	114
Nova Rossi 3.5cc .....	86
Enya 60 XF .....	105
Enya 80 XF .....	142*
OPS 80 Fan .....	134
ASP 61 R/C .....	107
ASP 75 heli .....	126*
Enya V-twin 40cc .....	99

\* denotes engine with increased capacity.

L  
Q  
  
N  
  
R  
C  
  
S  
T  
  
A  
Q  
  
L  
Q



much greater than that of its smaller predecessor. Table 1 shows that it's among the top-runners in this respect.

The rotor head's gearbox ratio of around 10:1 brings the engine's required rpm near to the 12,000 mark, so you can take advantage of the ASP 75's considerably greater torque at lower rpm. (Lower, quieter rotor speeds of around 1,200rpm are commonly used in non-competitive scale applications.) In practice, you're almost forced to use this rpm level because the heavy reciprocating piston assembly inhibits performance above 14,000 rpm; and at 14,600 rpm, running is markedly "ragged."

For this reason, I eventually did my usual "throttle-linearity" check at around 12,300rpm. A first attempt at the b.hp peak speed of 14,250 led to unsteady running at all throttle openings. At the lower, and more likely to be used, 12,300rpm, however, the linearity response was excellent and performance was very strong and steady. Only at mid throttle and just

below was the fuel flow obviously slightly rich; at all other throttle points, the original wide-open-throttle maximum power setting was accurately maintained. In this respect, the ASP 75 resembles other heli engines I've tested.

## PERFORMANCE

Tests run with a range of "fixed-wing" propellers before the torque tests proper confirmed the ASP 75's relatively restricted high rpm. At medium and lower rpm, the engine was strong and competitive and compared more favorably with other nominally "sports" engines.

**Test 1. Open exhaust.** Fuel: 10 percent nitro/15 percent ML70 synthetic/75 percent methanol. Plug: OPS 250.

ASP recommended 10 percent nitro and a "good commercial glow fuel." Above 6,000rpm, torque rose strongly and produced a result that only a few high-performance racing engines can beat (Nova Rossi: 21—14.29 oz.in/cc; OPS 15 Marine—14.7 oz.in/cc; O.S. 91 Ducted Fan—



*The ASP 75 has unusual twin transfer and single-boost ports. The solid-steel throttle barrel runs in a strong carburetor casting, and the spigot mount for the carburetor is of ample size.*

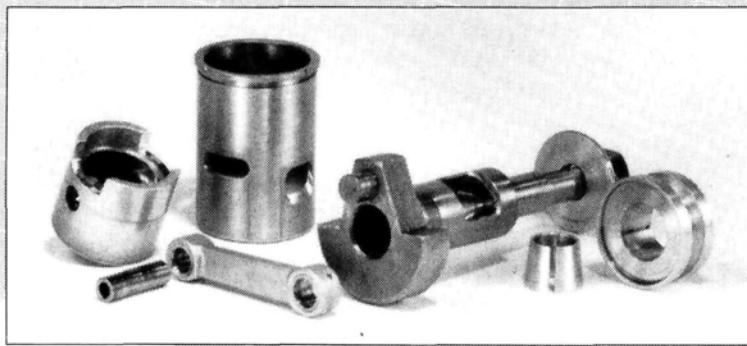
PHOTO BY MIKE BILLINGTON

14.24 oz.in/cc); Telco CO2—20.36 oz.in/cc). At 14.2 oz.in/cc, the ASP 75 certainly gave a higher open-exhaust result than any of the other 150 tests I've run on sports engines.

Past 18,000rpm, there was an obvious decline, and performance dropped below that of the ASP 61. The final horsepower maximum was no better than the smaller engine's 2.14 at 18,700rpm.

**Test 2. ASP Muffler.** Fuel and plug as in Test 1.

Use of this standard back-pressure muffler led to the usual reductions in torque, power and



*Observe the solid piston wall (almost 0.15 inch thick) and the large crank counterweight that's needed to balance it! The rod has bronze bushings at both ends.*

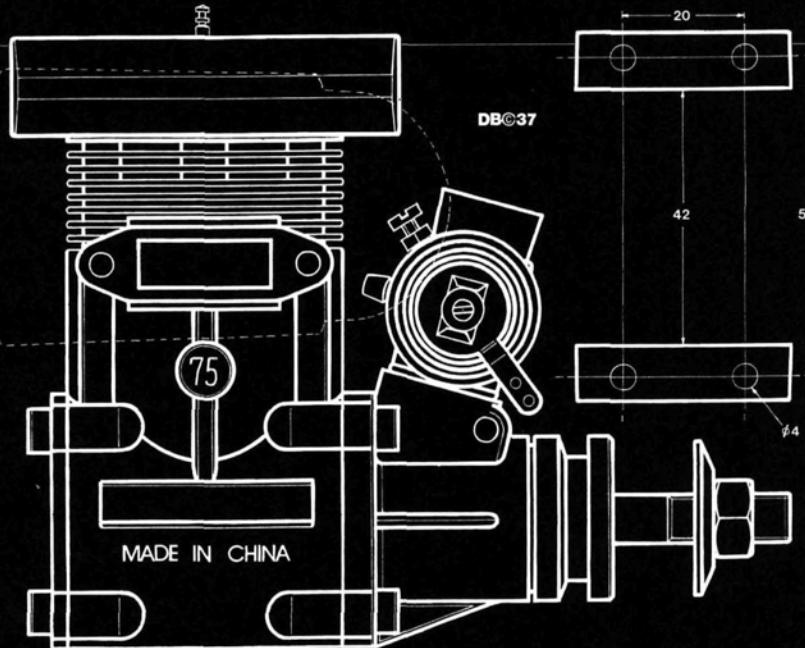
# SPECIFICATIONS

**ASP 75**

**76% OF FULL SIZE**

## WEIGHTS & DIMENSIONS

<b>Capacity</b>	0.730 in. (11.96cc)
<b>Bore</b>	1.0365 in. (26.33mm)
<b>Stroke</b>	0.8655 in. (21.98mm)
<b>Stroke/Bore ratio</b>	0.835:1
<b>Timing Periods</b>	Exhaust - 154° Transfer - 122° Boost - 110° (angled up 60°) Front Induction: —Opens - 38° ABDC —Closes - 50° ATDC Total Period - 192° Blow-down - 16° 0.95cc
<b>Combustion volume</b>	0.95cc
<b>Compression ratios</b>	Geometric - 13.6:1 Effective - 11.86:1
<b>Exhaust-port height</b>	0.290 inch (7.38mm)
<b>Cylinder-head squish</b>	0.014 inch (.35mm)
<b>Cylinder-head squish angle</b>	10°
<b>Squish-band width</b>	0.212 inch (5.4mm)
<b>Carburetor bore</b>	0.437 inch (11.1mm)
<b>Crankshaft diameter</b>	0.669 inch (17.0mm)



<b>Crankshaft bore</b>	0.473 inch (12.03mm)
<b>Crankpin diameter</b>	0.2745 inch (6.98mm)
<b>Crankshaft nose thread</b>	0.301 inch x 24 TPI (5/16 UNF)
<b>Wristpin diameter</b>	0.236 inch (6mm)
<b>Connecting-rod centers</b>	39mm
<b>Engine Height</b>	3.93 inches (99.94mm)
<b>Width</b>	2.36 inches (59.95 mm)
<b>Length</b>	3.66 inches (93mm— backplate to prop driver)
<b>Width between bearers</b>	1.65 inches (42mm)
<b>Mounting-hole dimensions</b>	2.05x.788 inches (52x20x4 mm)
<b>Exhaust-manifold bolt spacing</b>	1.38 inches (35mm)
<b>Frontal area</b>	7.18 square inches
<b>Weight</b>	Bare - 21.6 ounces (612 grams) With muffler - 26.4 ounces (748 kilo)
<b>Crankshaft weight</b>	3.45 inches (98 grams)
<b>Piston weight</b>	0.60 ounce (17 grams)

fuel consumption. Again, though, I recorded a high specific torque figure that would be great for sports fliers seeking lower rpm and noise levels. At 12.96 oz.in/cc, this test gave the ASP 75 the highest figure obtained with a muffler so far.

As already mentioned, with the muffler installed, running was "ragged" beyond 14,000rpm, and that brought this set of torque readings to an early close. Maximum horsepower of 1.79 was reached at 14,248 rpm and, even here, the unsteady running was obvious. The standard .61 muffler has probably been used here

(for the larger .75 engine), and this was bound to restrict top-end power while reducing noise to levels that compare with that of the smaller 10cc engine.

## SOUND LEVELS

To obtain sound readings, I ran the engines outdoors with Graupner fixed-wing propellers. I took two sets of readings—both with a muffler fitted. The effect on the second set of readings of lowering rpm levels is clear.

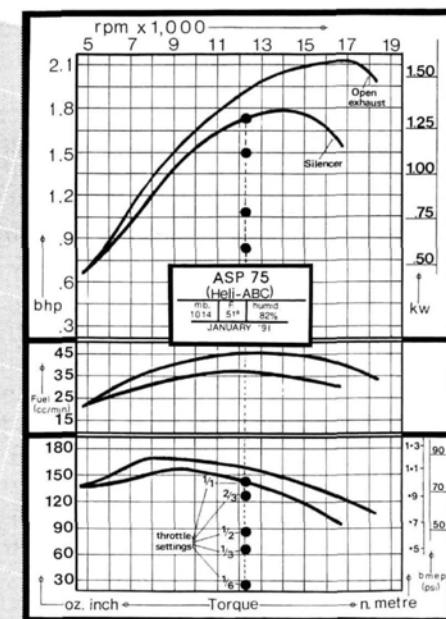
Admittedly, these figures don't reflect the real situation of the low-speed rotor, airframe and gearbox noises, but they're

**Performance:**

**Max. b.hp** ..... 2.11 @ 17,037 rpm (open exhaust /10% nitro)  
                   1.79 @ 14,248 rpm (standard muffler/10% nitro)  
**Max. torque** ..... 170 ounce/inches @ 7,850 rpm (open exhaust /10% nitro.)  
                   155 ounce/inches @ 9,420 rpm (standard muffler/10% nitro)

**RPM on standard fixed-wing propellers:**

	Open exhaust	ASP muffler
<b>18x8 Topflight</b>	5,520	5,310
<b>16x6 Airflow</b>	8,116	7,510
<b>14x7 Graupner</b>	9,236	8,690
<b>13x6 MK Glass</b>	11,870	11,230
<b>12x6 Mastro</b>	12,834	11,938
<b>11x6 Graupner</b>	14,970	14,175
<b>10x6 MK Glass</b>	—	15,035
<b>10x6 Master</b>	17,203	16,025
<b>10x4 Zinger</b>	—	16,230

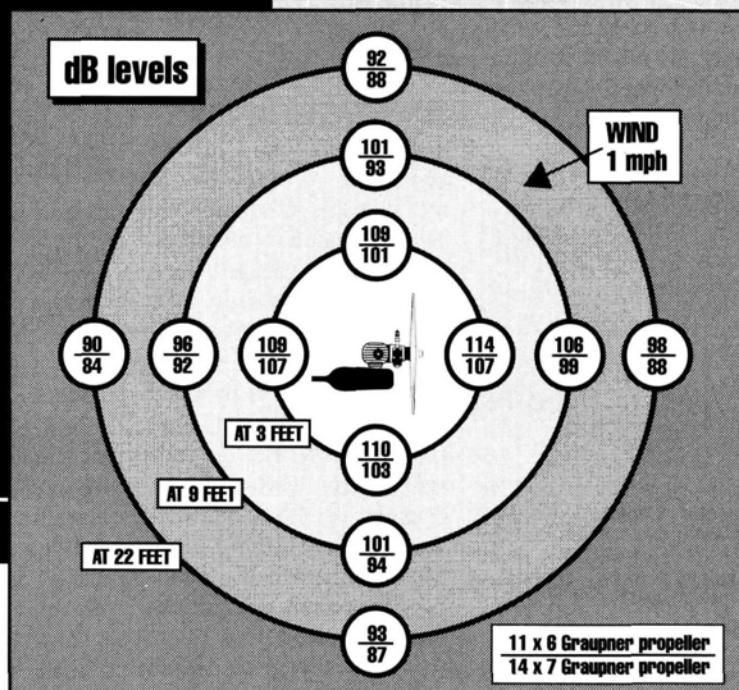
**Performance Equivalents:**

<b>b.hp/cubic inch</b>	2.89
<b>b.hp/cc</b>	0.176
<b>Ounce inch/cubic inch</b>	233.0
<b>Ounce inch/cc</b>	14.2
<b>Ounce inch/pound</b>	126.0
<b>Gram meter/cc</b>	10.15
<b>b.hp/pound</b>	1.56
<b>b.hp/kilo</b>	3.44
<b>b.hp/square-inch frontal area</b>	0.29

**Manufacturer:** ASP Engines, People's Republic of China  
**U.S. Distributor:** ISC International, P.O. Box 40116,  
                   Indianapolis, IN 46240.

**SOUND LEVELS—dB**

<b>Engine</b>	ASP 75 heli
<b>Equipment</b>	Standard muffler
<b>Fuel</b>	10 percent nitro; 15 percent ML70
<b>Temperature</b>	51°F.
<b>Humidity</b>	82 percent
<b>Propeller</b>	14x7 Graupner/11x6 Graupner
<b>Mean rpm</b>	8,500/14,000
<b>Engine position</b>	3 feet above ground
<b>Sound Meter</b>	Radio Shack's 33-2050 unit set at 38 inches above the ground and pointing toward nearest sound, i.e., propeller or muffler outlet. Three distances were used—3 feet, 9 feet and approximately 22 feet.



included for comparison as part of my series of dB tests engines (most of them for fixed-wing planes).

**CONCLUSION**

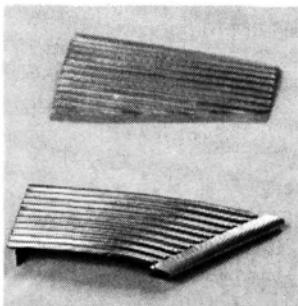
ASP has again given us a surprising performance from an unpretentious-looking engine—largely owing to their emphasis on piston/liner materials and on parts fit. This practical, sturdy ASP 75 engine definitely gives the most torque for your dollar, and in this respect, it seems unassailable. ■

# GIANT STEPS

## TIN SKINS AND BUILDING TIPS

by DICK PHILLIPS

**W**HEN I WAS at Northwest Model Expo in Puyallup, WA, I ran into model-builder Tom Murray of Hood River, OR. He's working on an interesting project—an 1/8-scale, 114-inch-span Ford Tri-motor—and has agreed to keep in touch with me about it. Although this model isn't unusual, the material that Tom is using to build it is.



Here are some samples of the corrugated aluminum that Tom Murray has made for his Ford Tri-motor. He can make this material in a variety of sizes. (The piece in the foreground is 4½ inches long.)

Tom has a job in the aviation industry, so he works with sheet aluminum all the time. He has been working with it at home, too, and he has developed a way to produce beautiful, scale, corrugated aluminum. The samples he brought to Puyallup convinced me that his Ford Tri-motor will be a striking plane. The prototype will be a static model, and it has already been sold. The second

model will fly, and it will probably use Technopower II radial engines (The nine-cylinder versions would certainly look great on this plane.)

As I mentioned, Tom will update me on the model's progress, and I'll have some photos of it soon.

### TIGER MOTH REVIVED

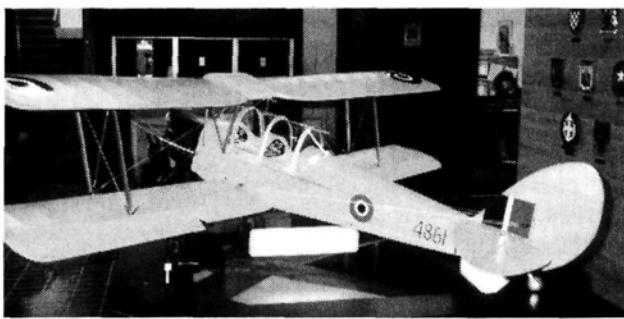
**M**y friend John Clark of Clark Airscrew\* told me that his company recently decided to manufacture a kit that hasn't been available for a while—the Canadian-made Barkley Tiger Moth. It was once a popular kit, but it dropped out of sight some time ago. (During WW II, the full-size Tigers were used by Canada in the Commonwealth Air Training Plan. Most of them had a canopy over their open cockpits to protect their pilots from the severe Canadian



Introduced at the Toledo '91 Show, Wendell Hostetler's new Diabolo is 35-percent scale and spans 97 inches. Powered by a European 4.8ci twin, it should be a real "barn-burner"!

winters.)

John said that his company plans to correct the original kit's problems (i.e., departures from scale; insufficient material for the canopy and rails; the incorrect three-view: the exhaust is shown on the wrong side of the airplane).



Well-known scale modeler Nino Campana of Sault Ste. Marie, Ontario, Canada, built this Tiger Moth from a Canadian Barkley kit. This kit hasn't been available for several years, but it's being revived by Clark Airscrew.

The people at Clark Airscrew are conscious of quality, so I expect that the updates will be done well. John isn't sure when the new kits will be available, but

**more new plans**

**G**ene Falada\* offers a very large plan for an obscure (to me!) WW II amphibious German plane. Gene calls it the "Flying Wooden Shoe," but the Luftwaffe knew it as the Blohm or the Voss BV-138C. He has been researching this plane for several years, and this has enabled him to draw very accurate scale plans that are appropriate for experienced builders. He has a lot of information on the full-size plane, and he'll provide copies of this material to anyone who's interested in building the 11-foot-span model.

Gene hasn't built a prototype, but he says that the plane's structure will have the "beef" to carry large engines. He has also designed plans for a smaller version, which has a wingspan of 7 feet, 4 inches (1/12 scale).

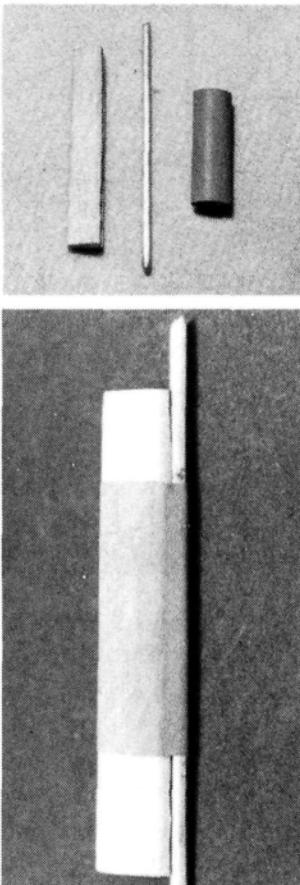
## WENDELL STRIKES AGAIN!

Wendell Hostetler\* is offering new plans for a 35-percent-scale, 20-pound Diabolo that's 75½ inches long, has a 97-inch wingspan and a 1,515-square-inch wing area. His prototype flew with a 4.8ci German twin. With such weight and power, this plane should be a stellar performer. Although I haven't seen the plans or the prototype (it was introduced in April, at the show in Toledo, OH), Wendell's work is always good, and I'm certain this plane won't be an exception.

## RENO-STYLE AIR RACING

The R/C Unlimited Air Races\* (RCUR) will be held on October 3 through 6, 1991, in Madera, CA. I'll have more details on the location soon. If you plan to race, you must register prior to the event, and your model must comply with certain rules. The deadline for registration was June 30, 1990. Keep in mind that this isn't a rally or a weekend get-together; it's a contest for which you must pre-register. If you missed the deadline, you'll be attending as a spectator only.

If you have an air-show act or a team that wishes to take part in the air show, contact RCUR for a brochure giving details on how to become involved. Again, you must pre-register, and the aircraft must meet certain requirements. Like the racers, show teams must qualify to participate. Trophies and cash prizes will be



*Top: You can use heat-shrink tubing to hold fairings and wire struts together. Tubing of the appropriate size that has been "shrunk" joins the parts securely. Bottom: This wire strut and wooden fairing have been joined with the heat-shrink tubing. This "quick and dirty" method works well.*

awarded to successful participants in both of the meet's events.

Between now and race day, I'll feature photos of some of the model entries that have either been built or are still being built. If you're planning to enter and have photos that you'd like to share, mail them to my attention at *Model Airplane News*.

## BUILDING TIPS

When you make wing or cabane struts, do you

have difficulty deciding how to fasten the wire strut to the wooden strut fairing? Over the years, I've tried several methods, and I recently tried a new one for the first time—heat-shrink tubing. Those who are into electric projects will be familiar with it, but for the uninitiated, it's plastic tubing that shrinks when it's heated. It comes in a variety of sizes, and it shouldn't be difficult to find a size that suits your strut. (Stores such as Radio Shack carry this tubing.)

Applying the tubing is simplicity itself. Cut a piece of the appropriate length, slip it over the strut and its wooden fairing and then heat. (A sealing iron works very well.) I usually cut the tubing so that it's slightly longer than the fairing and, when it shrinks, it covers the end of the wood and makes a tight seal. The tubing holds the wood and the strut together very tightly (they seem almost to become one piece), but you can glue them, too. If you shape and sand the wood carefully before you apply the tubing, the part will look very good indeed.

Heat-shrink tubing is available in several colors, but it will also take paint without any problems. Just check that the plastic doesn't react to your favorite finishing material. If you ever have to separate the fairing and the strut, carefully slit the tubing with a sharp knife, and pull them apart.

## BATTERY BACKUPS

I believe in redundant battery systems, and I always

supply my models with plenty of battery capacity. I buy the best Ni-Cd cells I can find; I assemble my own 1200mAh battery packs; and I protect them with foam sleeves. I fly with the confidence that I'm unlikely to have battery problems, and using 1200mAh batteries (instead of the usual 500mAh batteries) makes me even more confident.

Safety is doubly guaranteed with the use of a redundant battery switcher. If a battery fails (or weakens because I've flown the plane for too long), the system will automatically switch to the spare battery. LEDs (lights) on the unit's face indicate that the system has switched over, and when the plane lands, I know whether anything has gone wrong at a glance. With this system, I fly knowing that it will be my spastic thumbs—not failed batteries—that cause my crashes! Neither redundant systems nor large batteries are expensive, and they're much less costly than losing a plane.

\*Here are the addresses that are pertinent to this article:

**Clark Airscrew**, RR #4, Tottenham, Ontario, Canada L0G 1W0.

**Gene Falada**, 22W070 Byron Ave., Addison, IL 60101.

**Wendell Hostetler's Plans**, 1041 Heatherwood Ln., Orrville, OH 44667.

**R/C Unlimited Racing Inc.**, 565 Mercury Ln., Brea, CA 92621. ■



# QUIET FLIGHT

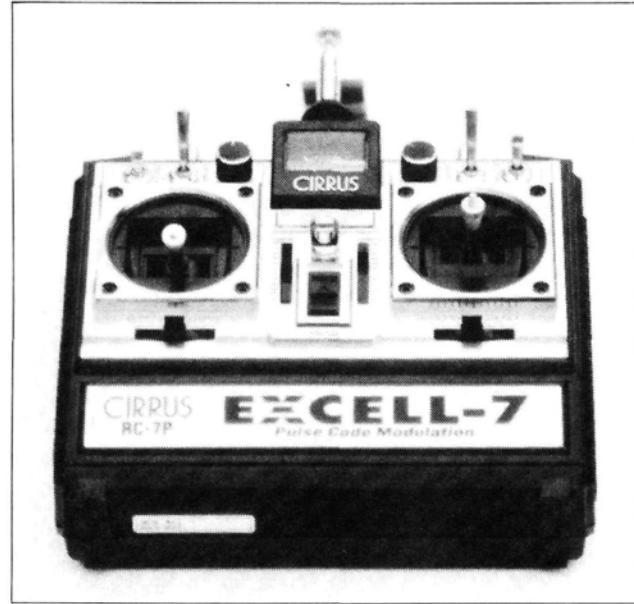
## STRETCHING THE TECHNOLOGY

by JOHN LUPPERGER

HERE SEEM TO be many simple low-end radios and multi-feature high-end (computer) radios available, but there's very little in between. The Cirrus Excell 7 PCM is moderately priced (about \$209.99 from Hobby Shack\*), and it has many features.

I've used mine in a couple of electric models, but I didn't take advantage of its special features. My first opportunity to use it in a model that would benefit from some basic mixing capabilities (but didn't need all the sophistication of a computer radio) was with the Project Explorer 2M.

The 2M requires one channel each for rudder, elevator, ailerons and spoil-



*The Cirrus Excell 7 PCM radio has three mixers, but it's reasonably priced. Although designed for power fliers, it's surprisingly well-suited to glider flying.*

and aileron, aileron-to-rudder mixing, "flaperon" mixing and throttle-to-flap mixing. The last two capa-

path control). It also occurred to me that, if the regular spoilers were on the throttle stick, I could have

them and the aileron spoilers working together. I switched on flaperon mixing and then tried the ailerons as spoilers. Everything worked OK! I then turned on throttle-to-flap

mixing and pulled the throttle stick down to open the regular spoilers. At half throttle, the ailerons started to rise. With the spoilers open and the ailerons up, the Explorer 2M settled in a real hurry.



*Left: you have to open the battery back to find the reversing switches, dual-rate adjustments, mixer gains and flaperon mixing switch. Right: function switches and knobs are easily accessible on the radio's upper face.*



ers. Besides the four basic functions, I wanted to couple the ailerons and the rudder—a feature that isn't available on low-end radios.

The Excell 7 has servo-reversing on all seven channels, dual rates on elevator

bilities were of special interest to me with regard to the Explorer 2M. I had installed separate servos on the ailerons, and I thought it might be possible to use them as spoilers, too (i.e., both ailerons up for glide-

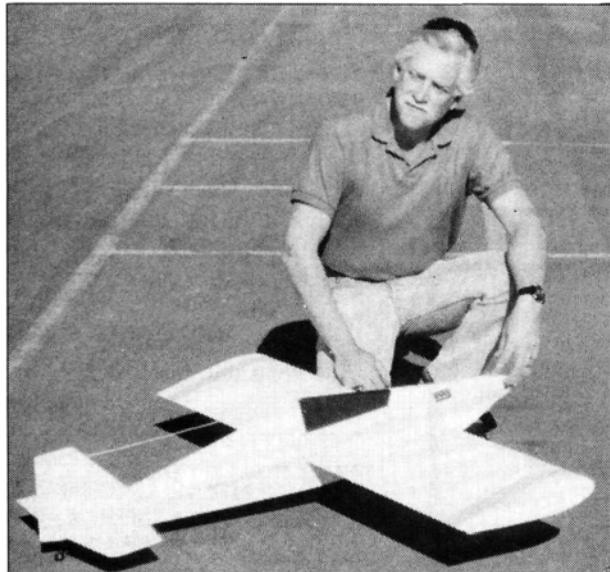
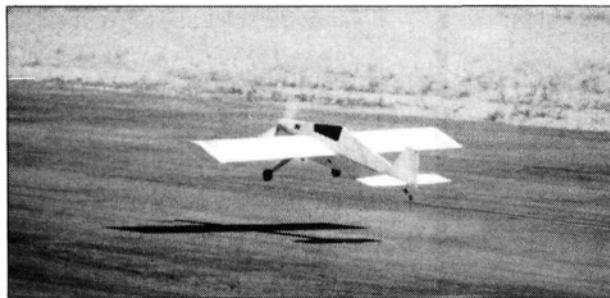
This mixing arrangement could also be used with the flaps and the spoilers. Instead of putting the flaps on the usual flap channel, you'd put them on the throttle stick and put the spoilers on the flap channel. This way, for the first half of the throttle travel, you'd have flaps only, and the spoilers would open during the last half of the stick movement.

There are many ways to use this radio's mixing, and though it doesn't offer all the fine adjustments of a computer radio, it's less expensive. If you're ready for a radio that has more than four basic channels, but you don't want to spend \$400 to \$600 on it, this might be just what you're looking for!

### 40-SIZE ELECTRIC HOTS

A couple of my long-time friends, Ron Black and Larry Clayton, decided to use the popular Hots design as a basis for a large, aerobatic, electric model. The 05 Electric Hots was the inspiration for this project, and Ron (co-designer and pilot) and Larry (co-designer and builder) based their model on the 60-size "wet-powered" Hots.

Their 7<sup>1</sup>/<sub>4</sub>-pound electric version is powered by a geared Astro\* Cobalt 40 on 21 cells turning a 12x6 Master Airscrew\* prop. It has a 54-inch wingspan, an area of 702 square inches



■ Bottom: with builder Larry Clayton behind this model, you get an idea of how big the Cobalt 40-powered Hots is. This model has a wing loading of only 23.7 ounces. ■ Top: the first liftoff! Big Hots flies well right off the building board.

and a wing loading of 23.7 ounces per square foot. It's guided by a Futaba\* 5 PCM, and its power is controlled by an Astro ESC.

On a Saturday morning, I packed my camera in my backpack, climbed onto my motorcycle (my other hobby) and made the trip to Riverside, CA, for the test flight. As could be expected at the first flight of a new model, Ron and Larry were excited and slightly nervous. Because of my experience with the 05 Electric Hots, I assured them that, considering their model's flying weight, everything should go without a hitch. I'm happy to say that I was

right! After a thorough systems check, Ron set the big Hots up on the runway and advanced the throttle. The Hots accelerated straight down the middle of the runway and lifted off in short order. It needed some elevator trim for level flight, but otherwise it flew beautifully. Ron tried some rolls, loops and inverted flight, and all the maneuvers were easily accomplished.

Larry used the same airfoil as that used in the wet-power Hots. It's quite a lot thicker than the one used on the 05 Electric Hots kit. This seemed to slow the plane, probably owing to its additional frontal area and

parasitic drag, and everyone agreed that the airfoil from the 05 model would probably be better. If everything goes well in the final development stages, Larry might draw up plans and write a construction article for *Model Airplane News*. It would certainly be nice see a construction article for a "non-05" electric model. Until you've flown a big electric, you have no idea what you're missing!

### HANDY SANDING TOOL

The most important step in the production of a well-finished model is sanding. If you don't have nicely contoured parts, even joints and a smooth final surface on which to stick your covering, you won't have a beautiful finished model.

Because I have such a passion for sanding, I'm always on the lookout for good sanding tools. I have several T-bar sanders, hand-held belt sanders, sanding pads, etc. Each one fulfills a particular sanding need, but no one tool seems capable of doing a wide variety of jobs.

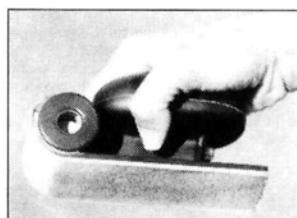
Well, now 3M has introduced its Hand Ease Sander. Its flat,  $2\frac{1}{2} \times 4\frac{1}{2}$ -inch sanding area is big enough for surface sanding, but still small enough for contour work (e.g., shaping a leading edge). It's molded of hard plastic and has a thin (about  $\frac{1}{16}$  inch) foam pad under the sanding surface. The padding prevents the tool's edges from digging into the work surface, but the sander can still smooth a butt joint without creating a dip on either side of the glued area. The

sticky-back sandpaper is stored in a cylinder on the front of the tool. When you need new paper, simply peel the old paper off the foam, pull down the fresh paper, press it onto the foam and rip off the used part. The curved front surface of the paper-storage cylinder is useful when you're sanding two uneven surfaces, as it prevents the block from gouging the higher surface. The rounded hand grip is comfortable, even when you have to sand large areas.

Best of all is the price—about \$4.99 at hardware and department stores! Sandpaper refills cost only \$2.99. It's a real bargain that helps you produce better-looking models.

### SLOPE-SOARING SITES

I don't do very much slope soaring. It's not that I don't like it; I just don't seem to have the time. I live less than half a mile from a suitable site, but work, family and magazine articles prevent me from going to



3M's Hand Ease Sander is great for model work. Sandpaper is stored in the cylinder on the front of sanding surface. The round handle is comfortable to hold.

the hill as often as I'd like. I occasionally receive letters from novice fliers who ask about slope soaring and the best type of site.

A good slope meets three basic requirements. The importance of each require-

(Continued on page 116)

# You're looking at

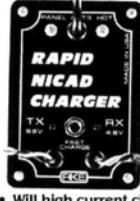


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## FAIRHOPE Flier

(Continued from page 34)

enough to be sanded to meet flush with the 1/4-inch sheet top, which is now glued to the sides and to F 8 and F 9. Trim and contour the sides and top to make rounded joints.

• **Landing gear.** For 4- to 6-pound planes, use aluminum landing gear. Drill two 13/64-inch holes in the landing-gear plate (F-4) as shown. Using a 1/4x20 tap, thread the two holes for 1/4-inch nylon bolts. Apply a drop or two of thin CA to strengthen and harden the threads. Run the tap through the holes after the glue has dried.

• **Engine cowl plate.** For the engine's bottom cowl plate, cut out and install a length of 1/4x3-inch sheet balsa that's long enough to suit your engine. Epoxy this piece to F 2, and glue F 1 to the front edge of this plate. Make sure F 1 is equidistant from F 2 at the top, the sides and the bottom. Cut out and fit 1/4-inch balsa-sheet cowl sides.

### THE CABIN

Fit the wing into the fuselage wing plat-

(Continued on page 93)

### Cleveland Giant Scales

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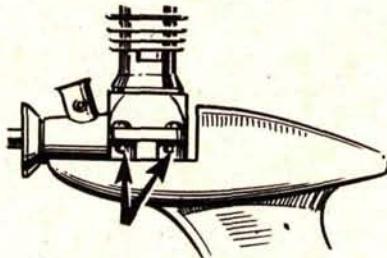
by JIM NEWMAN

# MODELING TIPS SPECIAL SECTION

## Engines and Control Systems Hints!

**Engines and control systems can be as challenging to work with as they are fascinating. This eight-page special section, which was prepared by famed artist, modeler and designer Jim Newman, offers you key solutions in areas that can increase your modeling expertise and stimulate new ideas.**

### ENGINE HINTS



#### ■ TUBULAR SPACERS

If you need to raise the thrust line to provide greater propeller clearance, you don't have to resort to using stacks of washers. Wheel collars with longer engine bolts make great thick "tubular spacers."



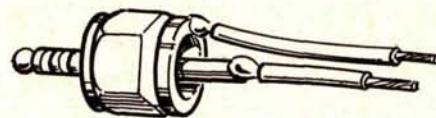
#### ■ FUEL-FILTER CLEANING

If the debris trapped in a metal filter screen resists the usual cleaning methods, light a match and burn it out. Afterwards, a quick rinse and a light scrub with an old toothbrush will restore the filter to a new condition.



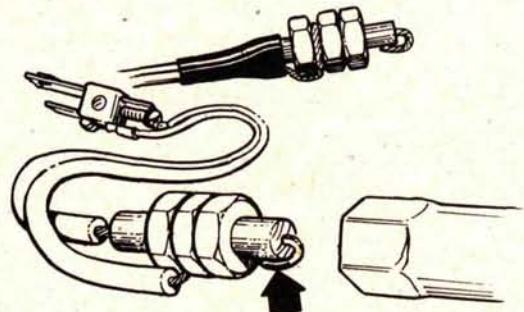
#### ■ O-RING REPLACEMENT

O-rings on needle valves are critical to proper mixture setting, and they can easily be damaged when being replaced. Slip an old, well-lubricated antenna over the needle threads. Carefully work the ring up over the increasing diameter until it drops neatly into the ring groove, undamaged.



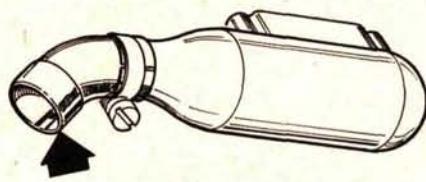
#### ■ PLUG PROTECTION

To protect their threads and elements, insert spare glow plugs into pieces of plastic or rubber fuel lines. Fasten several pieces to a strip of wood in your flight box.



#### ■ 1/2A NI-CD ADAPTER

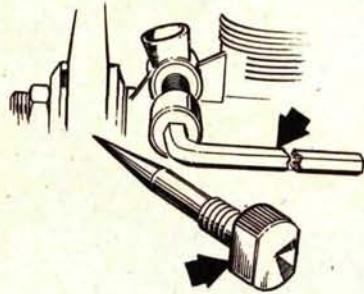
This allows a rechargeable Ni-Cd glow battery to be used on 1/2A engines. Reduce a piece of 1/8-inch dowel slightly, then thread three 8-32 nuts onto it. Drill a small hole lengthwise through the dowel, and bare a piece of copper hook-up wire and insert it through the hole so that it protrudes at the far end. Tin this end and then bend it over to form the center contact. Bare a second piece of hook-up wire, and insert it between two of the nuts to form the outer contact. Finally, attach both wires to a Du-Bro no. 149 Kwik-Klip as shown. To lock the nuts, use a dab of epoxy. To relieve the wires of bends and fatigue, it would be a good idea to "jacket" the two wires and the dowel in a shrink-sleeve as shown.



#### ■ EXHAUST DIVERTER

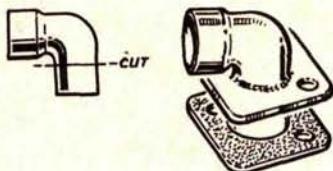
You can make this exhaust diverter with a copper elbow from the plumbing department of your local hardware store. Slit the elbow as shown, slip it over the end of the muffler, and then clamp it with a small hose clamp. If you dislike the elbow's copper color, coat it thinly with wipe-on solder.

# ENGINE HINTS



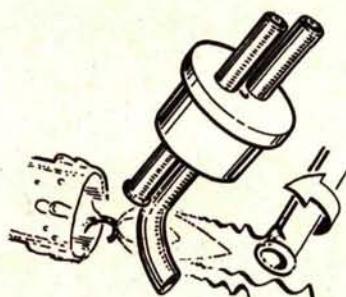
## ■ REMOTE NEEDLE-VALVE ADJUSTER

Use your Dremel Moto-Tool to grind flats on the side of the needle-valve knob. You can then make adjustments with a socket wrench or a nut driver while your fingers stay clear of the propeller. An even better tool for this is the flexible-drive carburetor adjuster that can be bent astern of the propeller.



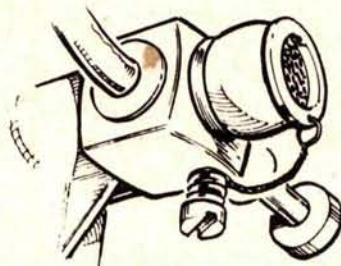
## ■ EASY ENGINE CHOKING!

On many cowled gasoline engines, it's difficult to reach in to choke the intake. Silver-solder a regular copper plumbing elbow, cut as required, to an adapter plate. Use cork or similar gasket material for the gasket when bolting the elbow to the carburetor flange. A regular cork or a surgical-rubber bung is used for choking. In addition, the elbow also serves as a neat ram air intake. A nylon-stocking filter might be a good idea in dusty conditions.



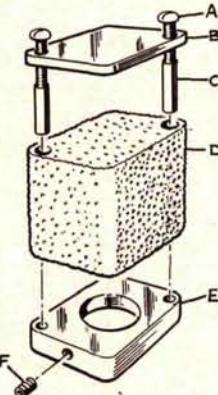
## ■ NYLON TANK PLUMBING

Have you ever had a mysterious fuel-feed problem, only to find that it was caused by a nearly invisible split in the brass tube inside the tank? End the grief by using the nylon tubing that's used to house flexible cable pushrods. To make permanent curves, gently heat the area to be curved over a flame. Likewise, to make a nipple to retain the flexible tubing inside the tank, heat the end of the nylon tubing in a flame, rotating it as you do so. This causes a raised ring to form on the end of the tubing.



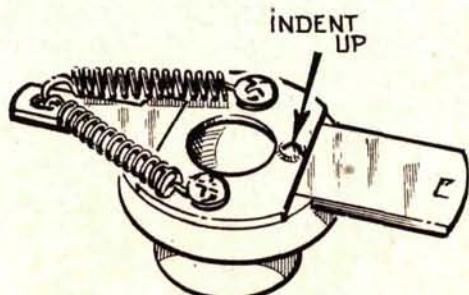
## ■ CAPTIVE AIR FILTER

Valuable air filters are easily lost, e.g., in nose-over landings. To eliminate the expense of replacements, pierce a hole in the lip of the rubber cap, then twist fine copper wire through it and around the idle screw. Now it may pop off, but it stays with the ship.



## ■ REUSABLE FOAM AIR FILTER

Easily constructed with simple hand tools, this filter is a must on dusty fields that will quickly destroy your engine. The porous foam element (which can be cut off a lawn-mower filter) can be removed, washed in gasoline, soaked in a light oil and then put back on your engine. (A) 6-32x $\frac{3}{4}$ -inch machine screws; (B) 1/16-inch-thick aluminum top plate; (C) 7/16-inch-long brass tubes; (D) 1-inch-thick, foam-plastic<sup>®</sup> filter; (E) 1/4-inch-thick aluminum plate; (F) 6-32x1/4-inch setscrew. The hole in the lower plate is sized to fit snugly over the carburetor intake where it's retained by the setscrew.

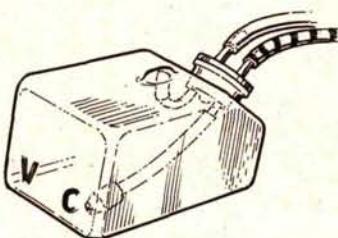
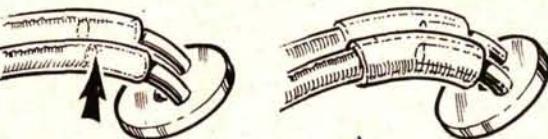


## ■ SPRING-LOADED CHOKE

If you don't like the stay-put choke on your Saito, remove the screws that hold the slide retainer down, and flip the retainer over so that the indent is facing upward. Replace the screws, add a couple of springs—hardware-store variety—then check that the slide moves freely under spring return. The dual springs equalize the load on the slide.

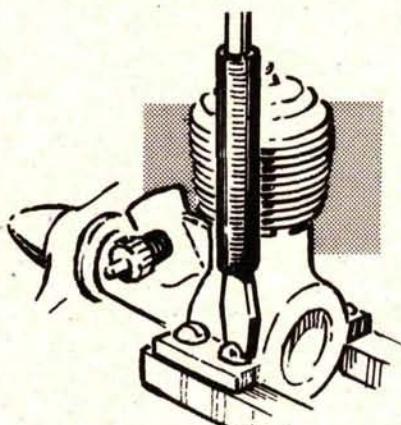
### **FUEL-LINE REINFORCEMENT**

Frequently, holes appear in the fuel line just at the end of the brass tube that goes into the tank (see arrow). To effectively reinforce the fuel line where it joins the tubes, slip short pieces of a slightly larger fuel line over the tubes as shown.



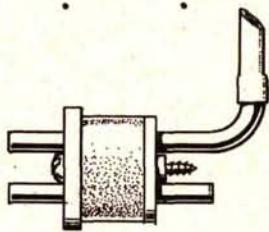
### **FUEL-LINE IDENTIFIERS**

When the tank, stopper and fuel lines are ready to be inserted into the tank bay, use a permanent marker to draw stripes on the carburetor fuel line; also write the letters "V" (for vent) and "C" (for carburetor) on the tank's rear wall, opposite the appropriate lines. When you have to replace the lines later, the marks will tell you which tube is which.



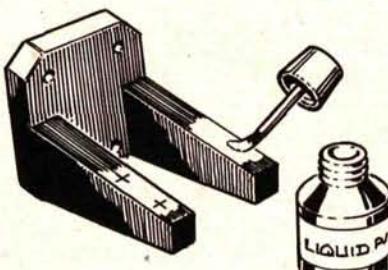
### **FIN PROTECTION**

Put a rubber tube over the shank of your screwdriver to avoid damaging your engine's cylinder fins if the screwdriver slips.



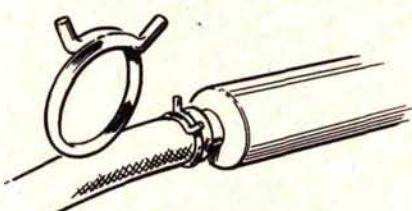
### **FLEXIBLE VENT PIPE**

Some plastic fuel tanks have a small blister on top, and when the vent pipe is bent up to fit into it, it can be extremely difficult to push the stopper/pipe assembly through the tank opening. The trick is to keep the brass vent pipe short and to add a piece of silicone-rubber fuel line to the end to make up the length. Now the vent will flex as it enters the tank's stopper opening:



### **EASIER MARKING**

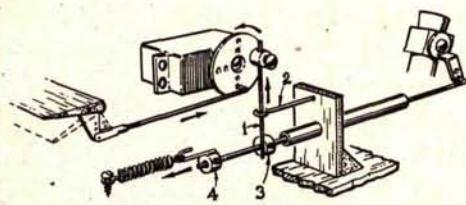
It's difficult to make legible markings on black composite engine mounts or carbon fiber, but Liquid Paper correction paint, which dries in seconds, makes it easy. Apply a coat or two where marks will be made (e.g., engine bolts), and when it dries, it will accept pencil, pen, or scribe marks. When you've finished drilling, remove the Liquid Paper easily with solvents that you probably have in your shop.



### **EXHAUST-EXTENSION RETAINER**

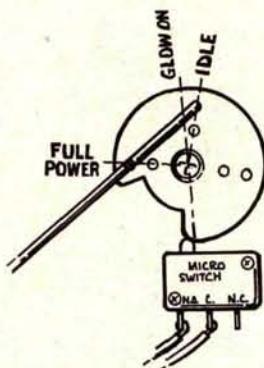
Have you ever lost exhaust diverters because the supplied nylon cable tie just failed to hold up in that oily, hot environment? (Urethane rubber extensions often suffer the same fate, too.) One solution is an inexpensive,  $\frac{3}{8}$ -inch-diameter, automotive heater-hose clamp of the type shown.

# ENGINE HINTS



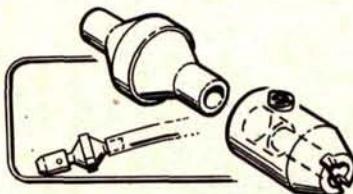
## ■ ENGINE CUTOFF

This is great for 2-channel radios or limited-engine-run events. A quick jab of full-down elevator withdraws the trigger wire (1) from behind the stop collar (3), and this allows the spring to pull the throttle pushrod all the way back to the closed position. Item 2 is the trigger-wire guide, and the collar (4) allows you to adjust the spring tension.



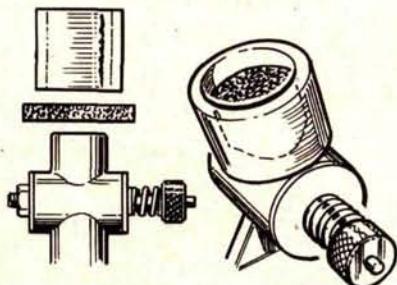
## ■ ON-BOARD IGNITION SWITCHING

Use this handy cam and microswitch on the throttle servo. The cam is made by cutting away part of the servo wheel, and the switch is mounted so that it's activated by the cam when the power is reduced to approximately quarter throttle.



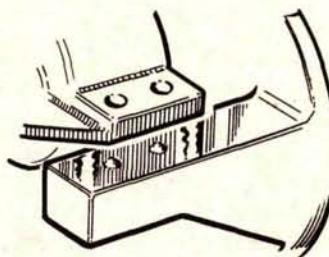
## ■ IN-TANK FILTER

When there isn't enough space between the engine and the firewall, do this: drill the clunk weight so that the filter nipple fits tightly into the hole. Drill and tap the weight for a 2-56 setscrew, and when you press the filter into place, apply a slight smear of silicone sealant for good measure.



## ■ DO-IT-YOURSELF AIR FILTER

Air filters for small engines are either difficult to find or are so bulky that they're impractical in small models. Buy a 1/4-inch-thick foam-filter element (the type used for lawn mowers) and some large-diameter clear-vinyl tube (from your local hardware store). Cut the foam 1/8 inch larger than the outside diameter of the venturi, and cut a piece that's twice its length. Assemble both as shown.



## ■ ENGINE-MOUNT MARKING

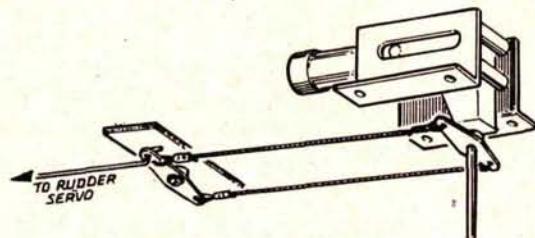
Before drilling engine mounts, spread a thin film of oil over the mounting surfaces. Set the engine in place, align it as required, then drop a pinch of talcum powder (or baking soda) into its mounting holes. Carefully lift the engine, and you'll find neat, white dots marking the spots to be punched and drilled.



## ■ CARBURETOR DUST EXCLUDER

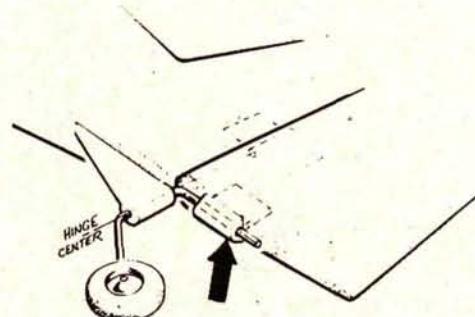
It's important to keep dust out of your carburetor. After flying, treat your engine with after-run oil, then roll up an inexpensive, foam ear plug (available at airports and sporting goods stores), and push it into the carburetor venturi.

# CONTROL SYSTEM HINTS



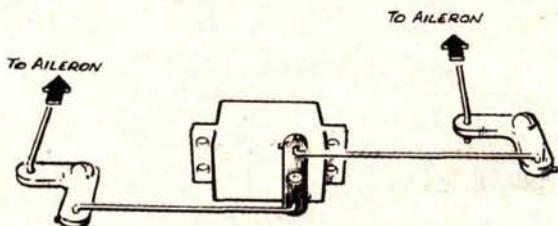
## RETRACTABLE STEERING LINKAGE

Here's a way to connect Rhom-Air, steerable, retractable nose gear. The .018-inch, standard, steel, control-line cable or nylon fishing line slackens as the gear retracts, and this allows the centering spring to operate. The bellcrank to which the cables are attached is a cut-down 1/2A control-line bellcrank.



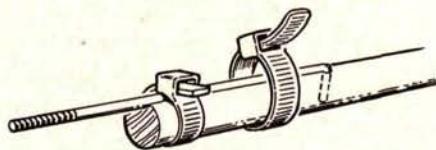
## RUDDER/TAIL-WHEEL CONNECTION

Glue a regular strip of aileron-horn torque-rod bearing into the bottom of the rudder, then slide this over your tail-wheel wire as shown. This eliminates the need to glue the wire into the rudder and, by using a long, removable hinge wire in the rudder hinges, you can remove the rudder for repair, etc.



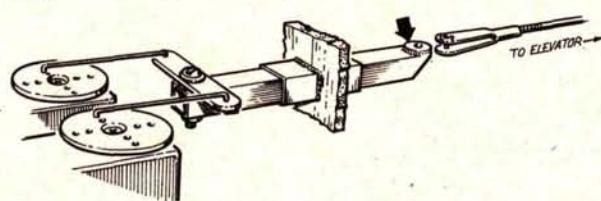
## AILERON-ROD HOOKUP

Instead of using commercial accessories at the center of your aileron pushrod (the type designed to allow connection to one side of the servo arm), attach the rods to opposite sides of the servo arm and then install the aileron bellcranks as shown.



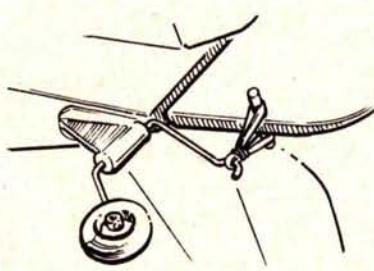
## SPEEDY PUSHROD ENDS

Instead of using thread and glue to bind wire fittings to your pushrods, use nylon cable ties from Radio Shack. After pulling them tight, coat them with thick CA.



## SERVO DOUBLER

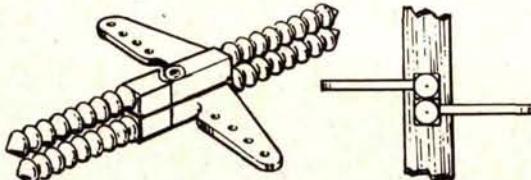
In giant models, it's usual to "double up" on elevator servos. Here's an elevator doubler made of a common brass tube. Failure of one servo halves the available servo throw, but it still allows you to fly home safely. Make a "thickness" doubler by soldering on extra metal where the clevis is attached (see arrow). This is necessary to provide a more robust bearing for the clevis pin, but you might want to replace the clevis with a Du-Bro Swivel Ball-Link. The bellcrank coupling the two servos can be made with a regular, thick, U-control bellcrank.



## SERVO GEAR SAVER

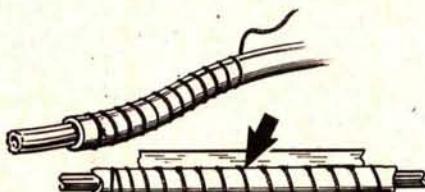
Taxiing over rough ground imposes severe shocks on the rudder's servo gears. To soften the impact, try gluing a dowel across the bottom of the rudder, then looping a rubber band lightly over the dowel and around the tail-wheel tiller arm. The rubber band now acts as a very effective shock absorber.

# CONTROL SYSTEM HINTS



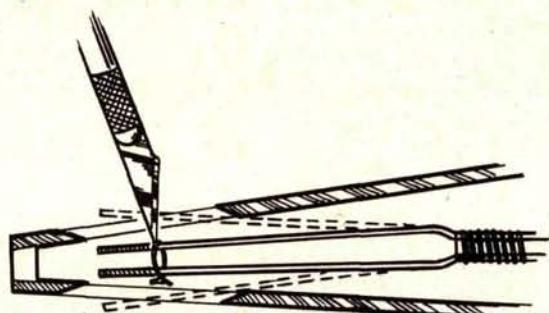
## PULL/PULL RUDDER HORN

Here's a neat way to avoid making a double-ended horn. Drill the control surface and fin, and then install two Robart Horny Hinge Points, one above the other. The slight difference in their heights isn't noticeable, and it won't affect the control geometry.



## EPOXY PUSHROD TUBES

This is a neat way of attaching nylon pushrod tubes to fuselage sides without using lots of weighty epoxy. Bind the tube with sewing thread as shown, place it against the fuselage side, then apply drops of CA where the thread and the side touch—simple, strong and light!



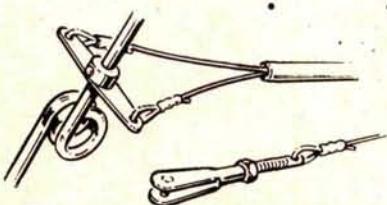
## INSERTING SPLIT PUSHRODS

Split pushrods are difficult to insert through a fuselage side, but this method makes it easy. Tie the rods' ends together with a loop of thread. When they're aligned with the exit holes, simply cut the loop with the tip of a modeling knife, and the threaded ends will pop right through!



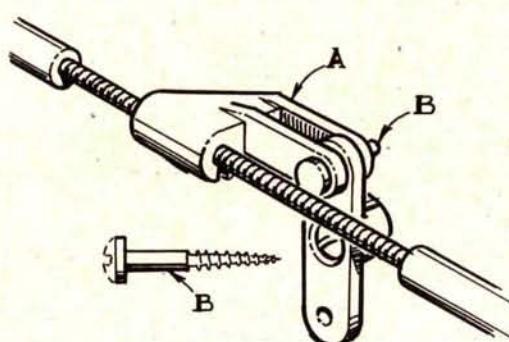
## PUSHROD GRIPS

Threaded-wire pushrods can be difficult to screw into those flexible nylon pushrods. You could bend an "L" in the end of the wire, or use pliers, which would scar the material. Why not simply fasten a suitable wheel collar to the wire to give you something to grip?



## POSITIVE NOSE-GEARSTEERING

Some retractable nose gears require dial-cord or nylon-line steering hookups, and this results in poor response. Replace the lines with the thick monofilament used in "Weedeaters," using 1/2-inch lengths of aluminum tube as crimps. You can use this fastening method at each end, but you might find it easier to have an adjustment method at one end. Try a clevis and a brass threaded coupler as shown (Nyrod conduit shown).



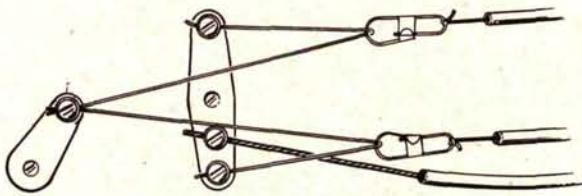
## DETACHABLE/ADJUSTABLE AILERON LINK

The deep jaw keeper (A)—try Hobby Lobby's—is attached to the servo arm by a clevis pin (B) that's made of a suitable screw or nail. When the keeper has been snapped over the threaded rod, the pin can't back out. Here, Nyrods are screwed onto the rod.



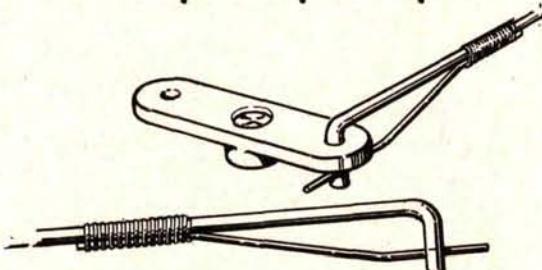
## STIFFEN NYRODS

Some model designs allow an excess of unsupported Nyrod—a potential cause of flutter. To give it additional support, insert a threaded-wire pushrod into the inner Nyrod the wrong way round, screwing a portion of the thread into the Nyrod before you add the clevis.



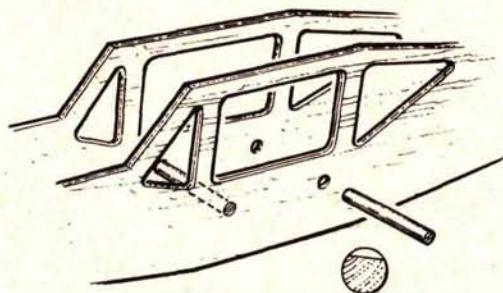
### ■ CONTROL MIXER

This mixer is especially suitable for differential spoilers, and with it, you won't need to use complex mechanical devices. Dacron threads are clamped to the spoiler servo arm with a regular Du-Bro or CG pushrod connector. The lines are then run through U-control or fishing-line connectors and back to the rudder servo arm. (Very small split rings can be used instead of U-control connectors.) The flexible cable or Nyrod rudder pushrod is attached to the appropriate side of the rudder servo arm.



### ■ QUICK-RELEASE PUSHROD END

This is how it was done before there were nylon clevises. It's an oldie, but goodie! The latch is made of 20-gauge music wire that has been bound and soldered. This is very useful in confined spaces, and it will never foul the servo-arm center at extremes of deflection.



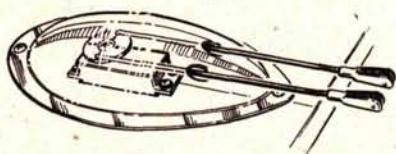
### ■ PARALLEL SERVO MOUNTS

If you have trouble getting your servo mounts parallel and level, try this. Sandwich the fuselage sides together, determine the servo location from the plan, then drill holes to accept 1/4-inch or 5/16-inch dowels. After the fuselage has been assembled and squared up, push the dowels through and glue them as shown. You should also file flats on the dowels as platforms for the grommets, except where they're glued into the holes (see cross-section).



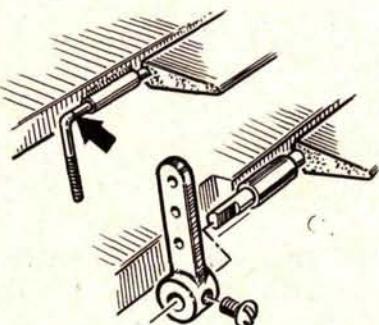
### ■ THREADED-COUPLE INSERTION

Twisting a threaded rod into a plastic pushrod "inner" can be hard on your fingers, so try this. Grip the rod gently in a drill chuck, run the drill, and twist the rod into place. If you use a variable-speed electric drill, be sure to select the lowest speed.



### ■ SERVO PROTECTION

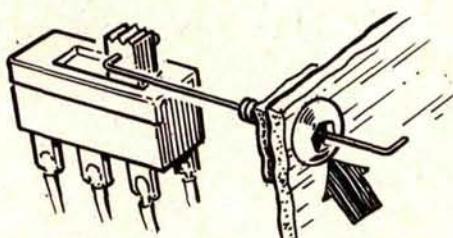
When you add ailerons to a Duraplane, your servo will protrude from the wing and be subjected to dirt and exhaust residue. To protect it, cover it with a commercial bubble canopy, and let the pushrods project through the slots in the rear of the molding.



### ■ REVERSE AILERON HORNS

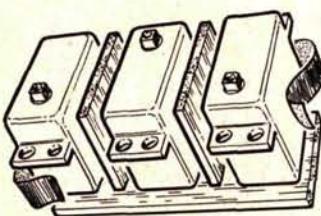
If you have a wing left over from a defunct high-wing model and would like to use it on a low-wing plane, you'll discover that the aileron horns are on the wrong side of the wing. Here's the solution: cut the torque rod at the arrow, grind flats on the wire, then use a pair of nose-gear steering arms. The use of Loctite on the setscrews is highly recommended.

# CONTROL SYSTEM HINTS



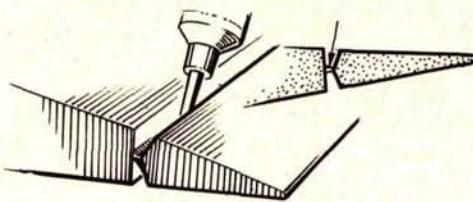
## ■ SWITCH ROD GUIDE

Don't throw away sheared-off 1/4-20 nylon wing bolts! Use a no. 52 drill bit to drill a hole lengthwise through a bolt and drill a 13/64-inch hole through the side of your plane's fuselage. The bolt makes a neat escutcheon and bushing for the switch rod. Remember to glue a small "scab" of plywood to the inside of the fuselage so that the bolt has something to thread into.



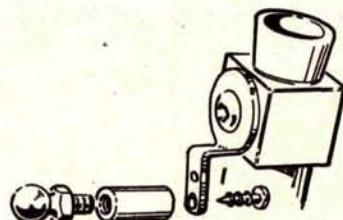
## ■ SERVO POSITIONING

If space is confined, tape your servos together, along with suitable spacing shims and a bottom shim. Be sure to have the rubber grommets in place on each servo. Set the cube of servos into the fuselage, then carefully fit the wooden servo mounts around them and secure them with CA. Spot-mark through the grommets, remove the cube, drill the mounts, remove the tape and mount each servo individually. With this technique, each servo will be properly spaced and aligned despite the cramped quarters.



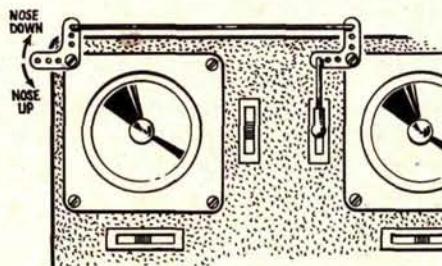
## ■ BETTER AILERON RESPONSE

Make your aileron response much crisper while reducing the drag caused by air leakage. Run a thin line of silicone adhesive or sealant along the gap between the ailerons and the wing. Then smooth it with a suitable tool or a wet finger. This idea can also be used as a hinge on small (.049 to .15) models.



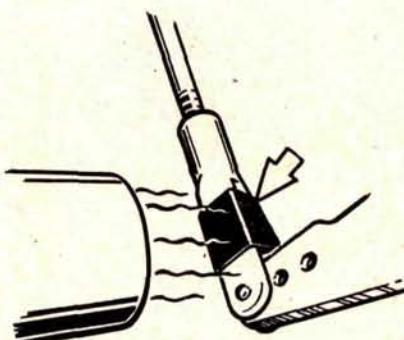
## ■ THROTTLE-ARM "STANDOFF"

Sometimes, the throttle pushrod has to be offset to clear something, and some 4-stroke engines, e.g., the Enya 120, could use a standoff as a matter of course. You can put this one together with a piece of Sullivan yellow nylon tube, a no. 2 sheet-metal screw and the ball part of a ball joint screwed into the tube.



## ■ REMOVE ELEVATOR TRIM LEVEL

By simply adding a pair of 90-degree bellcranks and 1/16-inch welding wire, you can move the elevator trim-control switch to the left side of the transmitter where it can be conveniently operated by your left thumb. This is especially useful for correcting altitude and air speed on final approach when you can't release the elevator stick. Exercise great care when drilling the trim lever to accept the ball component, which should be glued in place with CA.



## ■ CLEVIS SECURITY

Some fliers have had clevises open under heavy flight loads, and a fuel line has been known to slip off occasionally owing to oil on the clevis. Here's a solution: after attaching the clevis, slip a 1/2-inch length of heat-shrink tubing over it, then shrink it tight with a heat gun.

# FAIRHOPE Flier

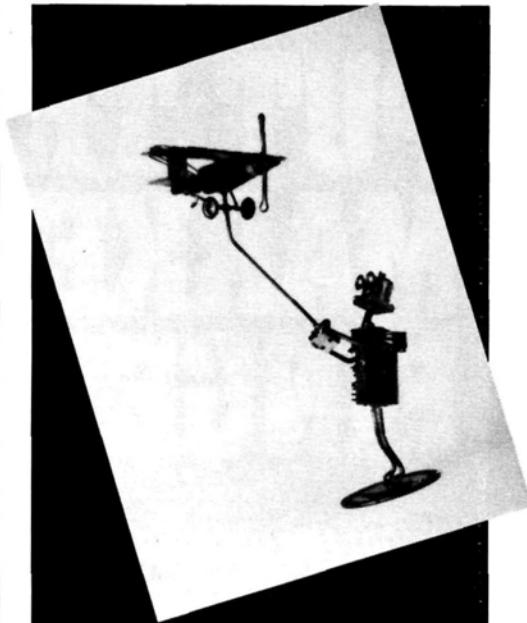
(Continued from page 82)

form, align it with the fuselage, and clamp it into place. Glue formers F 10, F 11 and F 12 into place on the top of the wing. (A cross-brace across the base of F 12 will increase strength.) Make a template by tracing the cabin sides, adding  $\frac{1}{16}$  inch to the top to allow for beveling. Fit the template to the top of the wing center section. This is a cut, sand and try process. For a

good-looking cabin wing joint, get it right!

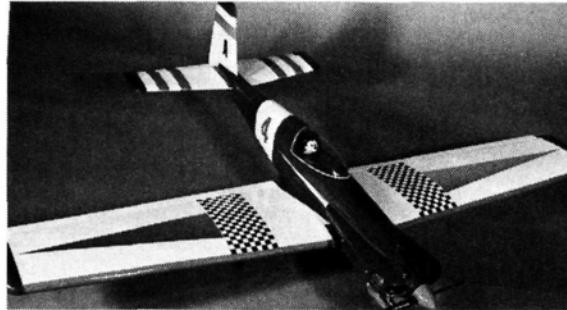
Using the finished template, cut the cabin sides out of  $\frac{3}{32}$ -inch sheet balsa. Check their alignment with the rear, sides and top of the fuselage, and glue the cabin sides to the formers and to the top of the wing. Do the same for the front side windows. Sand the tops of the cabin sides flat. Before installing the  $\frac{1}{16}$ -inch cabin top, check the accuracy of the wing's align-

(Continued on page 101)



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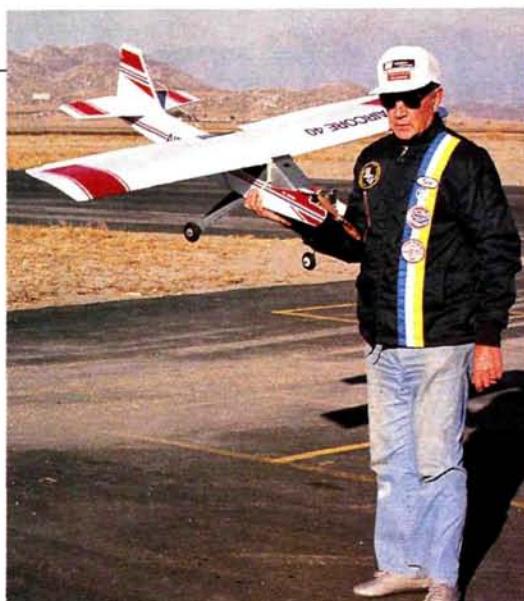
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**W**E'RE ALL FAMILIAR with those first-test-flight feelings. For those last few seconds before the airplane lifts off the runway, you're filled with apprehension. During the first few turns, you're terrified that something might go wrong, and you think that you'll need all your flying skills to avoid disaster. Once the plane has successfully demonstrated its airworthiness, though, the sense of calm and pride seem overwhelming.

This scene, however, is reserved for "ordinary" airplanes. The first flight of the AirCore\*.40 trainer was far from ordinary. Our usual reactions were replaced by snickers, giggles and guffaws.

Instead of admiring its beautiful finish with onlookers, we explained away our involvement with this improbable airplane. The roll-out was accompanied by wisecracks relating to the plane's "cardboard" construction and its misaligned wing and tail feathers. The first few turns were met



by BOB & EARL CARPENTER

with hysterical laughter because this unlikely plane, this ugly duckling,

this...this...thing was ripping up the sky as if it were the most sophisticated trainer

money could buy!

U.S. AirCore has come up with a revolutionary concept. The plane's durable material, the way in which it's built and the mobility of the plane's key components are all unique. Starting with a clean slate allowed the company to leave behind many of the typical drawbacks of an all-balsa plane.

## TRUE FLYING AND TOUGH TO KILL

# AIRCORE TRAINER .40

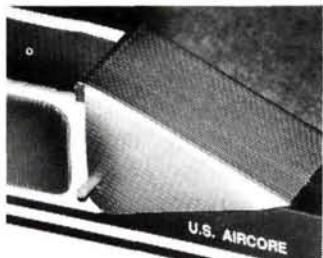


• • • • •

**"The company likes to call the building procedure 'fold up and fly'—a pretty accurate description."**

## CONSTRUCTION

AirCore is a strong, flexible, fuelproof plastic that's similar to fluted cardboard. The construction manual recommends that you build this plane over three to four eve-



*Nearly everything in this kit is made of AirCore: the wing, the fuselage, the doublers, the landing gear—even the fake window!*

nings; that allows plenty of time for practice on scrap pieces.

This plane's unique building process can be unnerving for experienced modelers. They'll have to put preconceived ideas out of their minds and follow the instructions to the letter. Beginners, however, shouldn't have any problems with this kit because they'll be inclined to follow directions without thinking ahead or trying to improve on the manufacturer's instructions.

You'll need contact cement (don't use the water-based kind) for the AirCore and CA or 5-minute epoxy (e.g., Quik-Cure and Insta-Cure\*) for a few other parts. Be careful when using contact cement! Spread the glue on evenly and let it dry until it's tacky. When two pieces

touch, they'll adhere instantly. You'll have one shot at assembling the wing, the fuselage and the other AirCore pieces. If you look closely at the ailerons on our airplane, you'll see our goof.

AirCore is scored so that it can be bent into the proper shape; use a hair dryer to heat the scored line and a straightedge to make a clean "break." You'll become an expert at this, because nearly everything in this kit is built with AirCore—even the landing gear!

The wing consists of a sheet of AirCore and a wooden spar. That's it! The spar gives the wing its shape and adds some strength but the rest of the wing is AirCore. AirCore is also used for the ribs. The company likes to call the build-



## SPECIFICATIONS

**Type:** Trainer  
**Wingspan:** 64 inches  
**Weight:** 5.75 pounds  
**Wing Area:** 704 square inches  
**Wing Loading:** 18.9 ounces per square foot

**Power Req'd:** .40 to .45 2-stroke, .50 4-stroke  
**No. of Channels Req'd:** 4 (ailerons, rudder, elevator and motor)

**Sug. Retail Price:** \$119.95  
**Features:** the entire structure is made of corrugated polypropylene. The Power Cartridge system allows the motor, the tank and the radio to be transferred to other models.

**Comments:** it may not win points in the beauty department, but the Aircore can really rip up the sky. Its durability and simple construction will relieve fledgling fliers of much stress come solo time.

ing procedure "fold up and fly"—a pretty accurate description.

The tailfeather assembly is strange, too. The stabilizer consists of two pieces of AirCore that are joined by inserting wooden dowels into the flutes. To create a hinge, trim the bottom of one of the flutes, and leave the top layer to act as a hinge.

AirCore's Power Cartridge is unique, but it can be adapted to nearly any balsa model. All of the important (and expensive) parts are mounted on a tray that you can slide into or out of the airplane. This innovative approach allows budget-minded modelers to build more than one airplane without laying out the cash for a second radio, engine, etc.

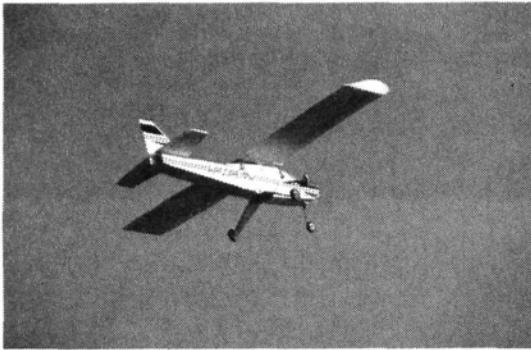
Because the cartridge is mounted on rails, it also serves as an easy balance adjuster. Hold the plane by the ends of the spar and slide the Power Cartridge in or out until the plane is slightly nose-heavy; then drill holes for the mounting screws. We used a trusty O.S.\* Surpass .40 4-stroke engine that has been used in many different airplanes.



*Initially, it's hard to imagine how the AirCore material will work. After examining it and reading the instructions, your apprehensions will dissipate.*

AIRCORE

# AIRCORE



## PERFORMANCE

As I mentioned at the beginning of this article, we really laughed when this airplane lifted off. Our previous building experience made it difficult for us to accept the low-tolerance, low-precision requirements. When we saw the 2-inch discrepancy between the wing and the tail feathers, we were convinced that the airplane either wouldn't fly or would fly poorly. We were wrong.

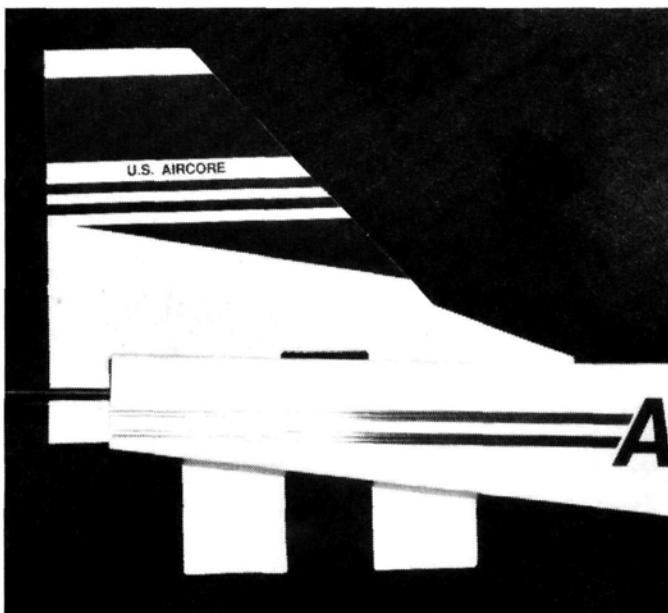
The AirCore trainer tracked straight down the runway, lifted off beautifully and, after a few trim adjustments, flew perfectly straight. After the plane ran through six or seven tanks of fuel at an empty airfield, we throttled-up the engine, aimed the plane down the runway and placed the Futaba\* Conquest FP-T4NL AM transmitter on the deck. The plane rose into the air and didn't stray from its

arrow-straight path until we picked the transmitter up—honest!

Our confidence in this plane was obviously extremely high. We knew that

seems to bend on impact. After one particularly horrible landing, we taxied crosswind (a "no-no"), and the plane flipped over onto its back with a loud thump. An ordinary balsa plane would have been heavily damaged, but the U.S. AirCore was unaffected. We bumped the wing a couple of times while transporting it, but we didn't even have to check for damage.

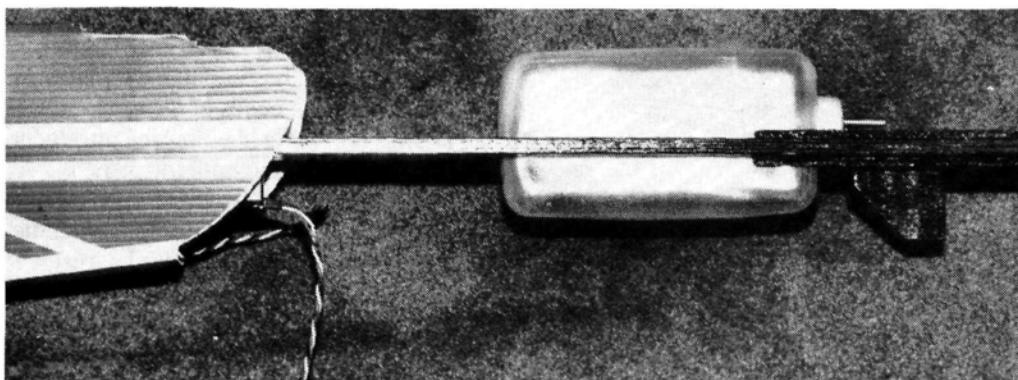
U.S. AirCore offers a



To make the tail-feather assembly, slip the vertical stabilizer into the slots and trim the tabs. It's a lot like building a toy, but its performance is impressive.

there was very little we could do to hurt it! The AirCore material is not only easy to build with, but it's also unbelievably tough. Every AirCore part just

video tape (available for \$12) that shows crash after crash of AirCore planes with remarkable results. Until you've played with the AirCore for a while, you



The Power Cartridge holds all of the expensive components, and it can be used with other airplanes.

**"An ordinary balsa plane would have been heavily damaged, but the U.S. AirCore was unaffected."**

• • • •

won't believe a model airplane can "auger" into the runway and sustain no damage!

If you know that it's pretty darn hard to damage your airplane, your confidence will soar. Beginners will benefit because disaster isn't lurking at every turn, and more experienced fliers can experiment with low-level flying or crazy stunts. In trainer form, the AirCore plane isn't sophisticated enough to perform extended inverted flights or Lomcevaks.

U.S. AirCore realizes this unusual airplane isn't for everyone; it *certainly* wouldn't be your pride and joy. It is, however, a great first airplane, and it's a kick in the pants as an alternative.

The trainer kit isn't cheap; \$119.95 may seem a little steep compared with the price of a typical balsa trainer, but all it takes is a crash or two, and the AirCore owner is way ahead of the game!

\*Here are the addresses of the companies mentioned in this article:  
**U.S. AirCore**, 4576 Claire Chennault, Hangar #7, Dallas, TX 75240.

**Quik-Cure/Insta-Cure**; distributed by Bob Smith Industries, 8060 Morro Rd., Atascadero, CA 93422.

**O.S Engines**; distributed by Great Planes Model Distributors Co., P.O. Box 4021, Champaign, IL 61824.

**Futaba Corp. of America**, 4 Studebaker, Irvine, CA 92718.

## FAIRHOPE FLIER

(Continued from page 93)

ment with the fuselage. Clamp the wing into place. Drill a  $\frac{1}{3}/4$ -inch hole through F 12 and F 13. Use a  $1/4$ -inch drill bit to enlarge the hole in F 12—*only* in F 12. Use a  $1/4 \times 20$  tap to thread the hole in F 13 for a  $1/4$ -inch nylon bolt.

Bolt the wing into place. Apply the cabin top sheeting, cross-grain, and cut a hole in it for the cardboard tube that guides the nylon hold-down bolt. (If you choose to build the tube, see the photographs for information.) You might just have a tube of this size available at home.

### COVERING

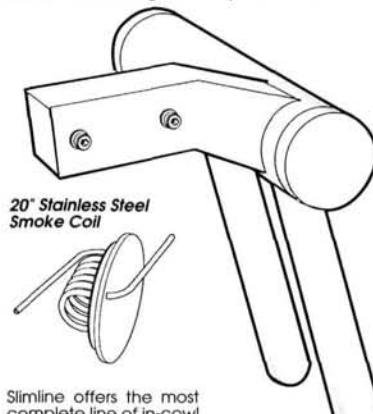
The models shown here are covered with Super MonoKote\*. When you've completed the covering, slide the tail assembly into the slot at the tail of the fuselage. After carefully aligning it with the fuselage, mark the fuselage outline on the tail assembly. Remove the tail, and cut away enough covering material to enable you to make a wood-to-wood glue joint.

### RADIO INSTALLATION

Install the aileron servo first. If you use a  
(Continued on page 109)

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ROYAL	25	40-45		40-45
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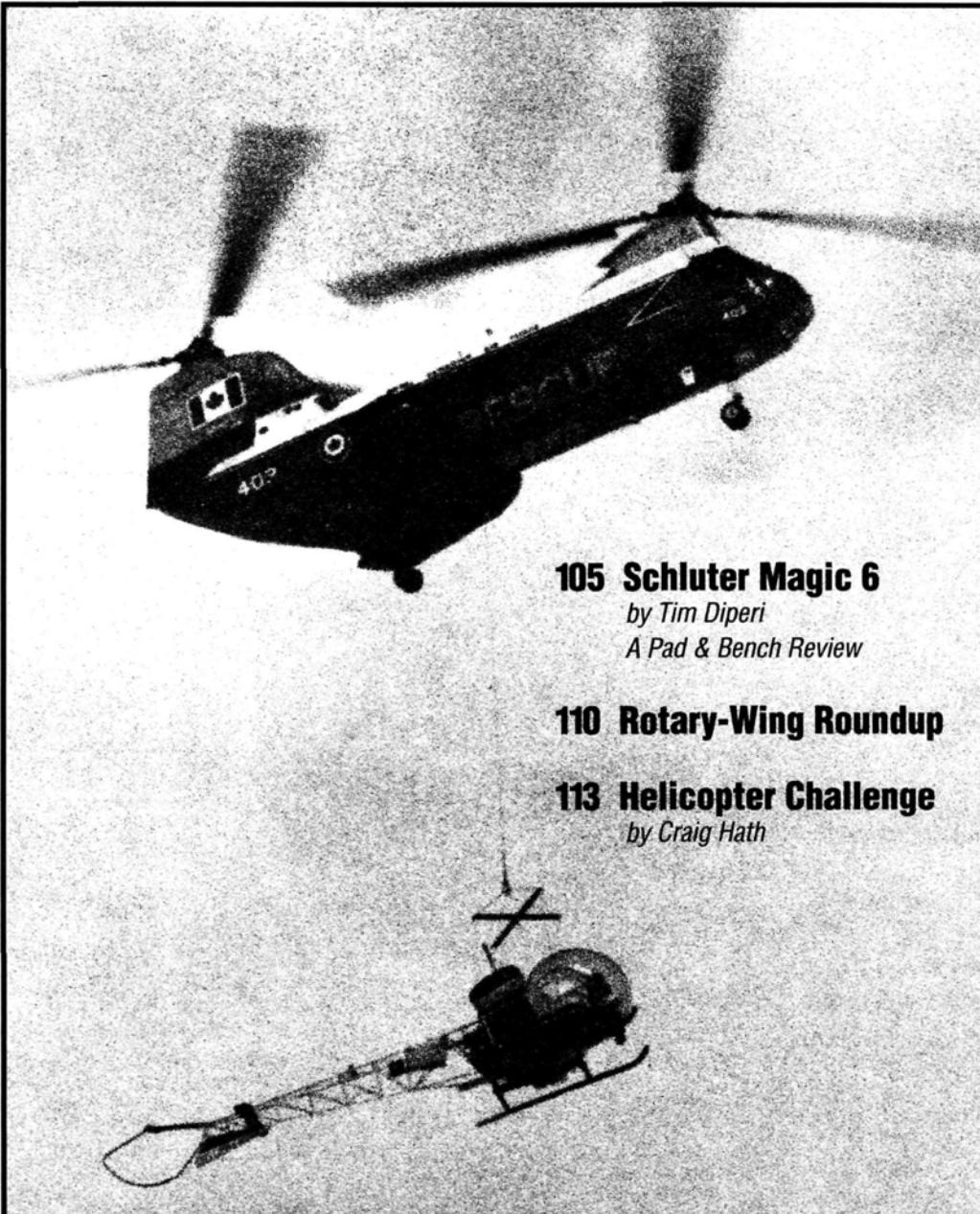
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# HELICOPTER SECTION

## CONTENTS



### 105 Schluter Magic 6

by Tim Diperi

*A Pad & Bench Review*

### 110 Rotary-Wing Roundup

### 113 Helicopter Challenge

by Craig Hath



*This month, Tim Diperi brings you a "Pad & Bench Review" of the Schluter Magic 60, which incorporates time-tested Schluter technology as well as some innovations. Craig Hath supplies a helpful guide to nose-in hovering.*

*Photo: Back in May '65, a Royal Canadian Air Force CH-113 Boeing Vertol successfully lifted a Bell 47 off Mt. Kennedy in the Yukon, at an altitude of 13,000 feet—a record at the time. The Bell was under charter to "National Geographic" when it was forced to land 300 feet from the summit.*

by TIM DIPERI

**T**HE MAGIC .60 helicopter is Schluter's\* latest development, and it incorporates proven Schluter designs as well as many innovations.

The kit comes in two boxes: one for the vacuum-formed canopy and another for the mechanics. In addition to many nuts, bolts, gears and bear-

ings, the kit includes a set of side frames and a tail boom that are anodized red instead of the usual black.



SCHLUTER

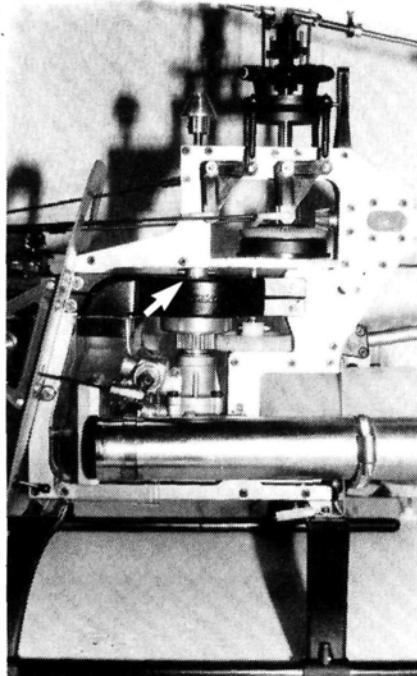
# MAGIC

# 60

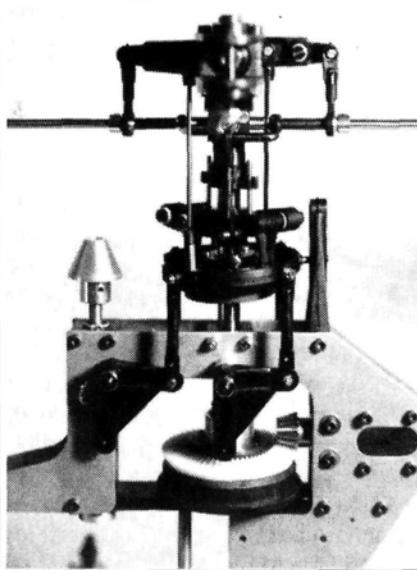
A gentle giant that's an agile athlete



The Magic has a unique transmission for a pod-and-boom helicopter. To engage the engine, the starting shaft is compressed.



Here are the transmission and the 45-degree offset swashplate. Notice the push/pull linkages on all the controls.



The large fuel tank holds enough fuel for about 22 minutes of flying. The landing-gear supports, the servo-tray, the blade holders, the mixing arms and the swashplate are made of fiberglass-filled nylon. The main rotor blades and the servo/mixing-tray support bulkhead are the only wooden parts.

The kit includes some nice little "extras," i.e., tools, thread-locking compound, high-quality bearing grease and a bag of spare nuts and bolts for those times when a part "flies" out of your fingers!

Because the engine isn't easily accessible after you've installed the canopy, Schluter also includes a remote glow-plug connector.

The instructions and the plans are both first-class.

## SPECIFICATIONS

**Type:** Pod-and-boom helicopter

**Length:** 55 inches

**Rotor Diameter:** 59 inches

**Weight:** 11.5 pounds

**Power Req'd:** .60 to .61 engine

**No. of Channels Req'd:** five (throttle, roll, pitch, tail rotor and collective)

**Sug. Retail Price:** \$799.99

The drawings on the large two-page (four sides) plans are one-third the actual size of the helicopter. The individually packed sub-assemblies and all the parts are numbered to correspond with steps described in the instructions, and there's a parts list at the end of the 10-page instruction manual.

## CONSTRUCTION

First, build the main chassis, which has two flat side frames. You must assemble and install the intermediate bearing blocks for the gear train. To align the parts properly, build this assembly on a flat surface. Bolt the side frames to the landing gear, which consists of two composite gear struts and two tubular aluminum skids. This lightweight gear is very forgiving during hard landings.

Next, install the starting shaft, which is independent of the engine/clutch assembly. The shaft has a starting cone on the top and a dogbone-type pin on the bottom. A collet and a spring (to force an upward return) support the shaft between a bearing and a bushing. This innovative setup is elegant, and it works as well as any conventional setup.

I used an old O.S.\* .60 powerplant (the one with a front plate and a backplate) and Schluter's new muffler. I modified this engine by installing a well-made Performance Specialties' ABC-style piston and sleeve. It was the third engine I tried, and I'm quite pleased with its power and reliability.

The instructions recommend that you use an engine with 8mm- or 9.5mm-diameter crankshafts. To ensure a good, self-centering fit, you install the fan unit on the crankshaft with the kit-supplied split-taper collet. (The kit comes with two collets—one for an 8mm and a 9.5mm crankshaft.) Mount the engine to the mainframe using the pair of machined mounting brackets.

The Magic's new tail rotor has a "sliding" pitch mixer, and it has all the attributes of a world-class system. During this assembly, it's extremely important not to mix up the two gears. (The instructions and plans warn you about this repeatedly.) If you do, the tail rotor will overspeed. When you've finished with this assembly, pack the entire gearbox.

**Features:** nylon servo tray with mechanical mixing; factory-built sub-assemblies (i.e., tail rotor, pitch mechanism, auto-rotation mechanism and swashplate); flexible landing gear; adjustable main rotor head.

**Comments:** building the Magic is enjoyable, and it only took about 7 hours to frame-up the mechanics. Average builders should easily have this machine airborne in less than 20 hours. The Magic might be slightly more expensive than some .60 machines, but it's worth it!

with grease.

The Magic uses Schluter's Systems '88 main rotor head. It's extremely powerful and reliable. To avoid bearing "lock-up," each blade holder is supported by two ball bearings and one thrust bearing.

## FINISHING

The canopy comes in vacu-formed halves that I trimmed and cemented together. I tinted the canopy by applying several light coats of Testor's\* transparent red paint to its interior, and I painted the tail boom and the fins to match. My friend Tony Garguilo of-

ferred to paint the Magic for me. He owns an auto-body shop in New York, and he has won many scale contests (the '87, '88 and '89 WRAM Shows), so I let him twist my arm.

## RADIO INSTALLATION

For guidance, I chose a Futaba\* 8-channel helicopter radio. Because of the tilting servo-mixing system, you have to use identical servos for pitch, roll and collective. I chose Futaba S-131 coreless ball-bearing servos. Introduced in Schluter's System '88 helicopters, this mixing system offers one of the best ways to link three controls mechanically. The

linkages support the swashplate in four places (every 90 degrees) and incorporate push/pull control on all inputs. The molded servo tray simplified the radio installation.

## FLYING

Before the first liftoff, I set the pitch on the main radio according to the instructions. The machine jumped into the air with minimal trim adjustment. This helicopter is one of the largest .60 machines on the market, and I must admit that I was a little apprehensive about its agility. Let me set the record straight: this machine can get up and go! On the first day out when I hadn't even begun to tweak the engine and it was running extremely rich, I was easily able to keep up with a much smaller, lighter machine.

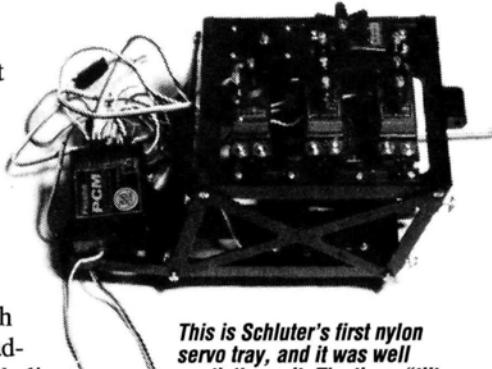
I set the Magic up to fly FAI maneuvers, and its vertical performance was surprising. The first time I pulled it into a stall turn, it seemed to climb forever, and I accomplished hovering maneuvers effortlessly. The Magic's powerful tail-rotor system gives you excellent control—even in strong crosswinds—and this makes it a docile trainer.

## OVERVIEW

The only modification I made to the Magic was to install a Robbe\* tubular tail drive instead of using the 2mm steel shaft. Although

I've never had any problems with music-wire tail-rotor shaft drives, I wanted to try the tubular drive.

The Schluter Magic was a pleasure to build. By carefully following the in-



This is Schluter's first nylon servo tray, and it was well worth the wait. The three "tilting" servos control pitch, roll and collective mechanically.

structions, an average builder can easily have this helicopter airborne in less than 20 hours. I framed-up the mechanics in about 7 hours, and I installed the linkage and radio in 2 hours. Although I didn't paint the body, a standard paint job would probably have taken another 2 hours. At less than \$1,000 for the kit, the engine and the gyro, the Magic is slightly more expensive than some .60 machines, but when you consider the kit's many features, it's still a good value.

\*Here are the addresses of the companies mentioned in this article:

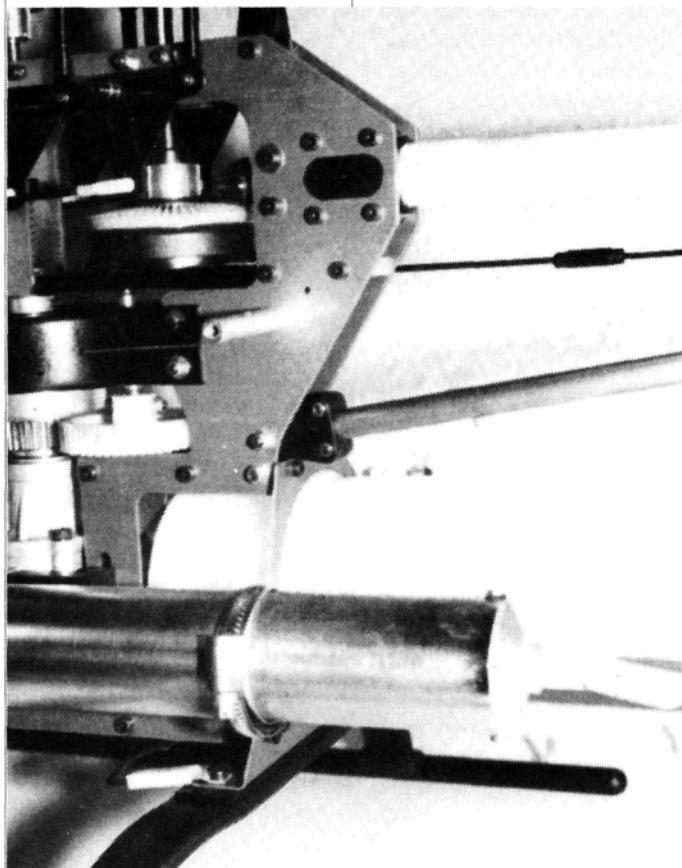
**Schluter**, distributed by Robbe Model Sport, 170 Township Line Rd., Belle Mead, NJ 08502.

**O.S./Great Planes Model Distributors**, P.O. Box 4021, Champaign, IL 61824.

**Performance Specialties**, P.O. Box 4003, Carlsbad, CA 92008. **Testor Corp.**, 620 Buckbee St., Rockford, IL 61104.

**Futaba Corp. of America**, 4 Studebaker, Irvine, CA 92718.

**Robbe Model Sport**, see above.



In this photo of the helicopter's rear, you can see the Schluter tuned muffler pipe. Notice how the boom support is attached to the main frame.

## FAIRHOPE FLIER

(Continued from page 101)

.40 engine, the model will probably balance with the radio equipment installed as shown on the plans. You can, however, balance the Fairhope Flier with almost any engine by sliding the servo tray back and forth on the servo rails and by carefully positioning the battery pack.

### THE FAIRHOPE FLIES!

For your first flight, set the controls as follows:

- Aileron travel: high rate—1/2 inch up, 3/8 inch down; low rate—3/8 inch up, 1/4 inch down.
- Elevator travel: high rate—1/2 inch, up and down; low rate—1/4 inch, up and down.
- Rudder: high rate—maximum travel, left and right; low rate—1/2 inch, left and right.

If your radio offers only one rate, use the low rates for the first flight, then make changes to suit your flying abilities later.

In flight, this model is utterly forgiving. You'll have no snaps into the ground on takeoff or landing, so relax! Before flying, double-check all systems, linkages, control movements, the wing hold-down screw, engine idle, the prop nut, the radio range and the CG position.

Start the engine, let it warm up and, holding the model, move to full throttle. Again, check the controls. Everything OK? Taxi onto the runway and advance to full throttle. Hold a little right rudder to offset torque as the engine winds up, and watch your Fairhope Flier climb into the skies. Nice, huh? Set the trims to neutral and you're on your own. The sky is yours—and the Fairhope Flier's!

(Continued on page 112)

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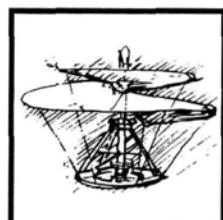
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2nd Place—\$900    5th Place—\$250

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Submit several clear photographs of your model (include flight shots) by AUGUST 1, 1991. Only models that have never been published or manufactured are eligible, but there is no restriction on type of R/C plane.

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Winners must be prepared to submit a complete construction article (6 to 8 typed, double-spaced pages; formatted on disc is preferred), good black-and-white photographs of the building sequence, full-size construction plans and color slides of the model, both on the ground and airborne. Before announcing the winners, the publisher must receive proof that plans, photographs and articles are available for the five chosen designs. Send your photos to "Design Contest," Model Airplane News, 251 Danbury Rd., Wilton, CT 06897.

# ROTARY-WING ROUNDUP

## ROBBE Schluter Magic 60 ARF

Robbe introduces the almost-ready-to-fly version of the successful Schluter Magic 60 helicopter. The kit's factory-built sub-assemblies include: main mechanics with fuel tank, bellcranks, swashplate and a collective-pitch compensator; a tail-rotor system complete with a tail boom with a control system, stabilizers and a tail strut; a complete main rotor head with covered blades; landing gear; and a trimmed canopy



that's ready for paint.

Part no. S2883

For more information, contact Robbe Model Sport, 170 Township Line Rd., Belle Mead, NJ 08502.

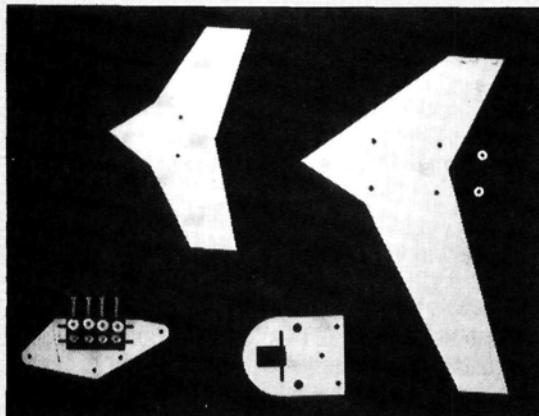
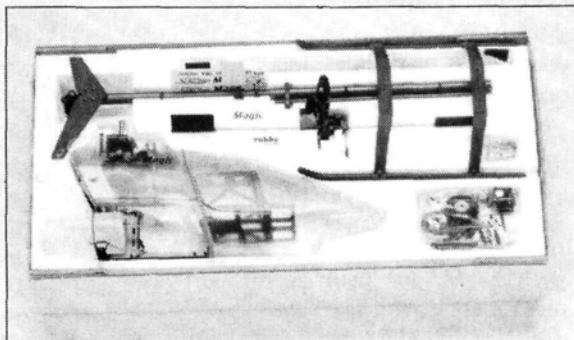
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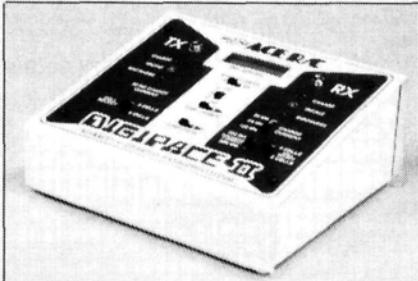
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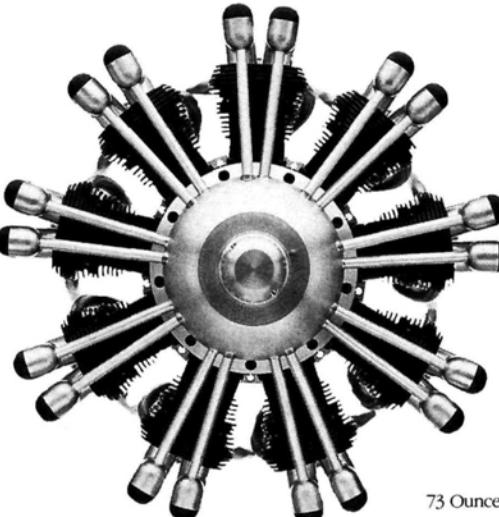
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## FAIRHOPE Flier

(Continued from page 109)

\*Here are the addresses of the companies mentioned in this article:

**Carl Goldberg Models Inc.**, 4734 West Chicago Ave., Chicago, IL 60651.

**MonoKote**; distributed by Top Flite Models, 2635 S. Wabash Ave., Chicago, IL 60616. ■

## THRUST TESTER

(Continued from page 58)

The other lead from the ammeter will connect to the positive pole of the motor.

## TESTING

Mount the Thrust Tester in a Black & Decker Workmate or in any vise. Mount the motor between the wedge-blocks, and clamp it to the Thrust Tester by turning the wing nuts on the 1/4-inch threaded rod. Make sure that everything is tight and in place. As you run the motor, read the thrust off the electronic scale, the amps from the ammeter and the rpm from the tach. Record the data that various combinations of propeller diameter and pitch produce to determine the best combination!

Good luck and happy landings!

\*Here's the address of the company mentioned in this article:

**Normark**, 1710 East 78 St., Minneapolis, MN 55423. ■

## MIDWEST MUSTANG

(Continued from page 65)

\*Here are the addresses of the companies mentioned in this article:

**Midwest Products Co.**, 400 S. Indiana St., Hobart, IN 46342.

**Robert Manufacturing**, 310 N. 5th St., St. Charles, IL 60174.

**Royal Products Corp.**, 790 W., Tennessee Ave., Denver, CO 80223.

(Continued on page 116)

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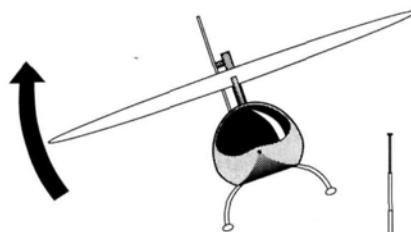
# Helicopter Challenge

Nose-on hovering: the ins and outs!

by CRAIG HATH

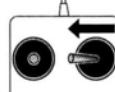
**PROBLEM:**

**Left side of the disc is low**



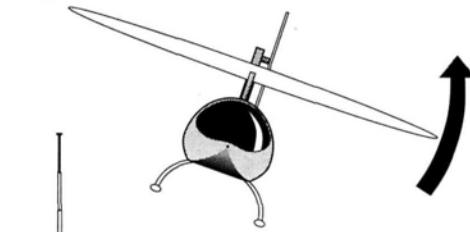
**SOLUTION:**

Move the stick toward the low end of the disk (left cyclic).



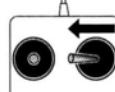
**PROBLEM:**

**Right side of the disc is low**



**SOLUTION:**

Move the stick toward the low end of the disk (right cyclic).



DURING THE PAST few months, I've discussed the basics of advanced flying, e.g., loops, rolls, stall turns and autorotations. I hope you've been able to practice some of these maneuvers. To complete this series, I'll discuss two more areas of advanced flight: in this issue, I'll cover nose-on hovering, and next month, I'll finish with inverted flight.

### NOSE-ON HOVERING

Just the mention of nose-on hovering can send chills down many pilots' spines, even if they're well-versed in flying nose-on in forward

flight and through the landing approach. Nose-on hovering will be much easier once you've assimilated the basics, e.g., the control response for pitch and roll cyclic and for tail-rotor pitch are reversed when the nose is turned toward the pilot. In other words, when the nose points away from you, the heli will hover to the right as you move the stick to the right. When the nose points toward you, it will hover to the left when the stick is moved to the right.

To hover successfully nose-on, I do two things: first, I watch the heli's tail and pretend that it's the nose; the tail-rotor pitch control now responds as if the heli were hovering nose-out. Second, I prop up the low side of the rotor disk by pushing the control stick toward the low side of the disk. The roll-cyclic commands will always be correct for leveling the machine.

Now, I can concentrate on flying the fore-and-aft cyclic, which is the only control that really seems backwards. Once you've become accustomed to re-

versing the other two flight controls and you've practiced the nose-on hover, you'll begin to react naturally to the helicopter's movements.

When you're ready to learn to fly nose-on, try the following technique: put the helicopter on the ground with the engine turned off. Imagine that it's hovering a few feet off the ground nose-on, and pretend to fly it with the transmitter for about a minute. Be sure to make the right corrections to hold the machine in a steady hover. Now, fire-up the machine, set it on the ground with the nose

**PROBLEM:**

**Nose is low**

**SOLUTION:**

Pull the stick towards you (aft cyclic).

Diagram of a remote control transmitter showing the stick pulled back (aft cyclic).

**PROBLEM:**

**Tail is low**

**SOLUTION:**

Push the stick forward (forward cyclic).

Diagram of a remote control transmitter showing the stick pushed forward (forward cyclic).

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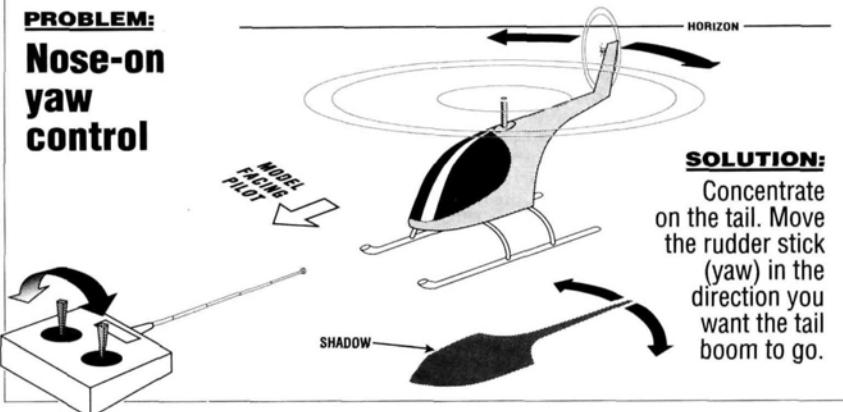


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## HELICOPTER CHALLENGE

### PROBLEM:

### Nose-on yaw control



### SOLUTION:

Concentrate on the tail. Move the rudder stick (yaw) in the direction you want the tail boom to go.

pointed into the wind, and stand in front of it. Make it lift slightly so that it's light on its skids, and try to stabilize it in a level position. Now, you'll have to learn how to hover all over again, and you'll have to get used to looking at the helicopter from this new perspective. As your confidence improves, lift the helicopter up a little higher until it can hover at around 2 or 3 feet for extended periods.

### HOVERING NOSE-ON TO NOSE-OUT

There are two steps in learning how to hover nose-on: the actual hover and the transition from nose-on to nose-out. As you work on hovering the helicopter nose-on, focus on keeping it under control, and then work on moving it around. When you feel confident, turn the nose away with tail-rotor pitch until the helicopter is nose-out. Learn to make the transition from nose-on to nose-out before you try it the other way around. As you rotate the machine's nose away from you, there's a point at which you mentally switch your control reactions from one mode to the other. You're really aware of it at first, and it's even a little unnerving. Don't fight this reaction; you have to become comfortable with this transition. You may also notice that, occasionally, when you rotate the nose away from you and fly nose-out, you'll still be "thinking" nose-on. If this happens, you'll be giving the helicopter backwards commands. The only way to avoid these situations is by practicing; the more the better. I prefer to practice when there's at least a little breeze; this helps to steady the

tail, and it also requires that you apply just a little fore or aft cyclic pitch to prevent drifting.

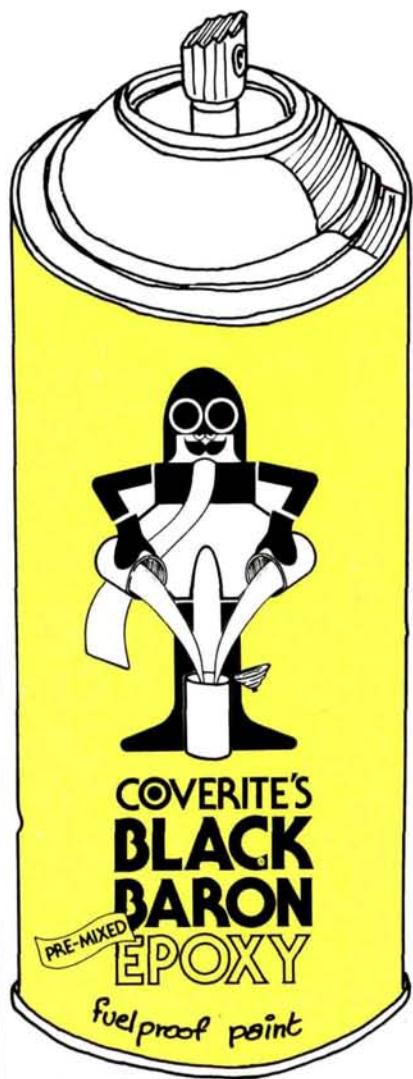
To help you make the transition into and out of nose-on hovering, make slow pirouettes in one direction and then in the other. With pirouettes, you can practice all aspects of hovering because cyclic-pitch corrections are needed to prevent the machine from wandering off to the side. Of course, if your machine is set up to hover properly, the learning process is easier. Keep working at it, and you'll be amazed at how well you'll do in a short time.

### HOT OFF THE PRESSES

I've just received the latest edition of "Ray's Complete Helicopter Manual, 3rd Edition" from good friend Ray Hostetler.

This excellent guide to helicopter flying is the result of many years of experimentation and record-keeping on Ray's part. If you've had an opportunity to fly with Ray, you know that his machines are rock-solid and his flight technique is superb. Any advice from him should be well-heeded. In this edition, Ray has added some advanced set-up techniques for the new computer radios, and he's updated some old material. Check it out!





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## MIDWEST MUSTANG

(Continued from page 112)

Dremel, 4915 21st St., Racine, WI 53406.  
Coverite, 420 Babylon Rd., Horsham, PA 19044.  
MonoKote/Great Planes Model Distributors,  
P.O. Box 4021, Champaign, IL 61824.  
Radio South, 9003 N. Davis, Pensacola, FL  
35214.

## QUIET FLIGHT

(Continued from page 81)

ment to you will depend on your level of skill and the model you fly.

• The hill must face the prevailing wind (at least on the day you want to fly!), and it shouldn't have too many obstructions in front of it. Wind coming straight into the hill is best, but you can fly when the wind comes in at an angle of as much as 45 degrees. Remember that for the most lift, a floater won't be as dependent on wind that comes straight in as an aerobatic sloper will.

• The hill should slope 45 to 90 degrees. Again, different slopes produce various degrees of lift. Lift also depends on the wind's strength. I have flown a floater fairly well off a hill with a slope of less than 45 degrees.

• There should be a reasonably large, flat landing area. This requirement is the most relevant to pilot skill. The less experience you have, the larger the landing area you'll need. Some of the best slopes I've ever flown had the smallest landing areas and would be unsuitable for all but the best pilots.

In the next few months, I'll try to include a little info on slope soaring to help those who've never tried it before. Who knows?—you might have a suitable site nearby; think of all the fun you've been missing!

Till next time...good thermals and a full charge!

(Continued on page 119)

### MIG 25 FOXBAT 1/11 SCALE

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## QUIET FLIGHT

(Continued from page 116)

\*Here are the addresses of the companies mentioned in this article:  
**Hobby Shack**; distributed by Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728.

**AstroFlight Inc.**, 13311 Beach Ave., Marina Del Rey, CA 90292.

**Master Airscrew**; distributed by Windsor Propeller Co., 384 Tesconi Ct., Santa Rosa, CA 95401.

**Futaba Corp. of America**, 4 Studebaker, Irvine, CA 92718.

## AIRWAVES

(Continued from page 11)

### FANTRAINER FAN

I'm a 17-year-old airplane freak. I bought a Cessna 177 ARF with a .10 engine, and it now has about 12 hours on it. Would I be capable of flying the Fantrainer? Would it fly well with just two servos?—for elevator and aileron. If so, could you recommend a reasonably priced radio. Though I'm looking forward to buying the Fantrainer, if you think it's too advanced for me, say so.

COREY McGEE  
Oberlin, LA

*Corey, the Fantrainer model continues to be popular, and more and more are showing up at shows and local flying fields. If it would only be your second model though, I'd have to point you away from it until you've had more stick time. The Fantrainer is a very clean design that flies much faster than a .10-powered cabin airplane. You'll have to work your way up to higher-performance models slowly by going from high-wing designs to shoulder wings and then to higher-powered, low-wing designs. You say that you want to buy a Fantrainer, and I think you mean the big Hobby Dynamics RFB Fantrainer 600. If so, stick*

(Continued on page 126)

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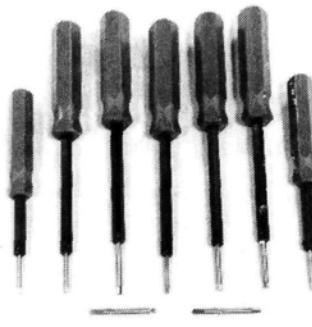
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# PRODUCT NEWS

Descriptions of new products appearing in these pages were derived from press releases by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by Model Airplane News, or guarantee product performance. When writing to the manufacturer about any product described here, be sure to mention that you read about it in Model Airplane News.



## RAE TECH Hex Drivers/Ball Drivers

Rae Tech offers hex drivers and ball drivers for serious modelers who are tired of dealing with stripped-out set-screws and badly worn wrenches. The steel tips are made of replaceable, high-speed-drill blanks, so if one breaks, you don't have to replace the entire tool. Straight hex drivers are available in 1.5mm, 2mm, 2.5mm, .050-inch, 1/16-inch, 3/32-inch and 5/64-inch sizes. The ball drivers are available in 2mm, 2.5mm, 3/32-inch and 5/64-inch sizes.

For more information, contact Rae Tech Inc., 3101 W. Thomas #115, Phoenix, AZ 85017.



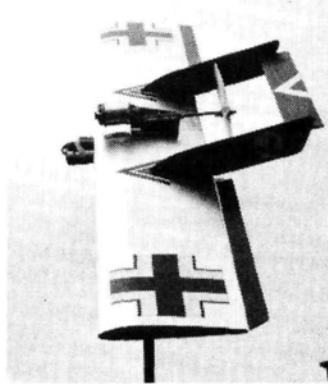
## COLONEL STUNNING PLANS Giant-Scale Plans

"Plans and Plastic" designs for the legendary Fokker D-VII and the RAF SE-5A are now available from Rich Uravitch. Both models are giant scale, but they're extremely easy to build and fly. Using conventional construction techniques and standard "off-the-shelf" materials, either design can be framed-up and ready to cover in two to three weeks. They're ideal for new-

comers to sport scale because, even with heavy gas engines (e.g., the Q-35 or the Zenoah G-38), their wing loadings range from 19 to 21 ounces per square foot. Despite their 75-inch wingspans, they're easy to transport and require no tedious rigging. Photo-illustrated instructions, ABS cowlings and other plastic parts are included. Either model can be powered by engines ranging from .90 to 1.08 2-strokes, to 2.2ci powerplants. The planes weigh from 15 to 19 pounds.

Price: \$36.95 each (UPS ppd. U.S.)

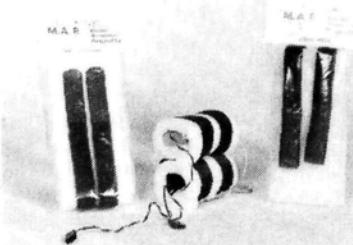
For more information, contact Rich Uravitch (MAN), 15 Newcomb Trail, Ridge, NY 11961.



## MODEL/TRONICS Psycho Max

Would you believe vertical performance is possible from an electric-powered model that can fly for 4 1/2 to 5 minutes? For intermediate and advanced pilots, the Psycho Max is a radical departure from typical electric aircraft. Everything about it is designed to reduce weight and electrical resistance to use the batteries' energy more efficiently. With a 7-cell, 1200mA, SCR battery pack, it weighs approximately 29 ounces, and it can take as little as 6 hours to build.

For more information, contact Model/Tronics Inc., 3824 24th Ave. West, Seattle, WA 98199.



## MODEL AVIATION PRODUCTS Secur-Rap Kit/Stack Pack

The Secur-Rap Kit is easy to use. Just attach the two Velcro® strips to your aircraft's interior, then wrap your receiver or battery pack in the Velcro®-strapped foam pads and they'll be held in place securely. The plane's balance will be right every time, and you'll be able to move your components with ease! The Stack Pack has extra Velcro® straps on top of the foam pads, so that you can stack a second unit on the first.

For more information, contact Model Aviation Products, P.O. Box 26017, San Bernardino, CA 92406.



## INNOVATIVE MODEL PRODUCTS Hawker Hurricane

Innovative Model Products introduces its 1/6-scale kit—the Hawker Hurricane. The model has an 80-inch wingspan and flies on a .75 to 1.08 2-stroke or a 1.20 4-stroke engine. To complete the scale effect, the fuselage has molded-in longerons, and the tail feathers are built up to be covered with fabric. Scale details such as spinners, props, a cockpit kit and retracts with tires are also available.

For more information, contact Innovative Model Products, P.O. Box 4365, Margate, FL 33063.

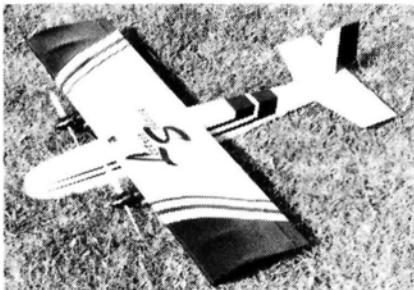


## RADIO CONTROL DEVELOPMENT

### RCD Micro 535 FM Receiver

In response to demands from racers and pilots for a small, multi-channel receiver, RCD introduces the Micro 535 FM 5-channel Dual Conversion receiver. Smaller than most standard 2-channel receivers (17/8x3/4x1 1/8 inches), the RCD Micro 535 weighs less than an ounce, yet it offers the same outstanding performance as the popular 7-channel RCD Platinum receivers. The Micro 535 surpasses all '91 AMA guidelines and will be available with most popular connectors and all 75MHz surface channels at a very affordable price.

For more information, contact Radio Control Development Inc., 9419 Abraham Way, Santee, CA 92071.



### AIR FLAIR Twin Letric Schtick

Air Flair announces its entry into the realm of electric flight with the Twin Letric Schtick. The power provided by its twin, gear-driven motors produces approximately 5 minutes of true, aerobatic flight. The sound of its twin props and gears in sync adds to the enjoyment of this unusual aircraft. The Twin Lectric Schtick is available as both a Standard and a Deluxe kit, which includes the two gear-driven motors.

For more information, contact Air Flair, P.O. Box 2075, Fairborn, OH 45324.

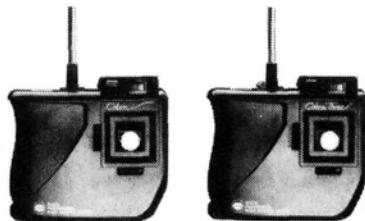


### BYRON ORIGINALS New Catalogue

This 104-page catalogue of Byron Originals' large-scale R/C aircraft and accessories has full-color photographs and graphics. It includes sections on sport and aerobatic models, ducted-fan jet models, warbird kits, finishing materials, unique scale and "convenience" accessories as well as a comprehensive section on Byron Originals' high-performance, blended fuels.

Price: \$4

For more information, contact Byron Originals Inc., P.O. Box 279, Ida Grove, IA 51445.



### COX HOBBIES Cobra and Cobra Three

The revolutionary 2-channel Cox Cobra may be the most comfortable transmitter you'll ever use. Whether you favor fingertip or thumb control, the Cobra transmitter is designed for your comfort. Its advanced circuitry and high-quality integrated components provide outstanding range, sensitivity to control commands and great performance.

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For more information, contact Cox Hobbies Inc., 350 West Rincon St., Corona, CA 91720.



### KILO MARINE Accurate anemometer

Get accurate information about wind speed from the new Windspeed anemometer offered by Kilo Marine. The rotor turns on a stainless-steel shaft at speeds proportional to wind velocity. The actual wind speed is determined by a unique rotating optical-light valve on the rotor shaft.

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For more information, contact Kilo Marine, P.O. Box 520, El Toro, CA 92630.



### SANYO FREE BATTERY REFERENCE CHART

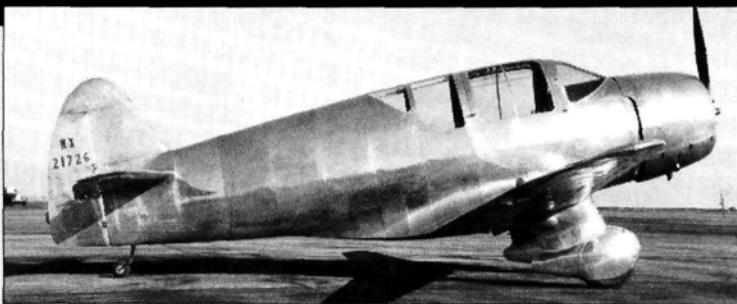
Sanyo's rechargeable Ni-Cds have consistently been favorites among electric-flight enthusiasts owing to their dependability and conservative capacity ratings. But did you know that Sanyo offers over 60 Ni-Cd cells in many weights and sizes and with a variety of capacities and internal resistances? Use Sanyo's free battery reference chart to determine the best cell choices for your electric drive system. The chart includes dimensions, capacities, weights and ratings of internal resistance; the lower the resistance, the more power a battery pack can give to the motor during flight.

For more information, contact Sanyo Energy Corp., Battery Division, 200 Riser Rd., Little Ferry, NJ 07643.

# NAME THAT PLANE

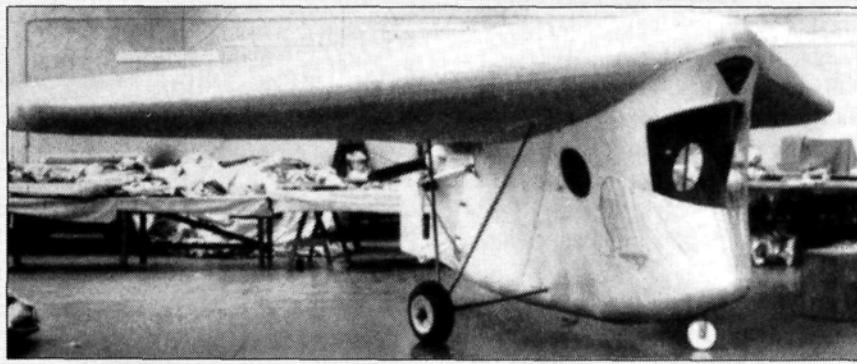
CAN YOU  
IDENTIFY THIS  
AIRCRAFT?

If so, send your answer to Model Airplane News, Name that Plane Contest (state issue in which plane appeared), 251 Danbury Rd., Wilton, CT 06897.



Congratulations to Col. M.R. Gallagher of Norton AFB, CA, for correctly identifying the mystery plane in the June issue—the British Perkins Inflatable Delta-Wing. Its entire airframe could be deflated and rolled into a bundle (4 feet, 3 inches long;

1 foot, 2 inches in diameter) around the 4-foot prop and the wheel struts. The 6hp opposed twin engine fit into a 16x16x16-inch box. The main wing was supported by an inflatable fabric beam that was divided into 11 spanwise tubes by single-ply cotton diaphragms. Its handlebar-type controls could be turned left and right (as on a bicycle) for steering, slid up and down for climbing and descending and tilted port and starboard for banking. A large domestic vacuum cleaner was used to inflate the fabric aircraft, and flight preparation took 25 minutes. The 167-pound plane had a wingspan of 26½ feet, and it first flew on March 7, 1956.



The winner will be drawn four weeks following publication from correct answers received (on a postcard delivered by U.S. Mail), and will receive a free one-year subscription to Model Airplane News. If already a subscriber, the winner will receive a free one-year extension of his subscription.

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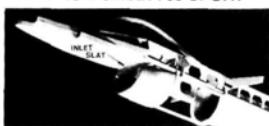
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# CLUB OF THE MONTH



**San Gabriel Valley R/C League**  
P.O. Box 9052, South El Monte, CA 91733-0292

**I**t sounds as if the members of San Gabriel Valley R/C League of South El Monte, CA, cope well with change. At the time of the May '91 newsletter, the club had elected new club officers; it had appointed a new newsletter editor; and it had set up a new frequency-control system at its flying field. The only constant in any organization is change, and SGVRCL's evolution hasn't slowed it down.

In the "President's Message," Jim Riccio thanks the members who made the changes go so smoothly. He mentions that the May 5 Giant Fun Fly, in which 40 aircraft participated, gave the club some good public exposure. Members were invited to participate in the May 19 U.S. Marine Corps Open House at the Air Station in Tustin, CA. Jim also mentions the club's Q-500 pylon race and the need for volunteers.

Senior Advisor Ken Meade has some good flying tips in his column, "Ken's Pen." The subject for May is strong wings and G-forces. Ken's detailed essay explains how much aerodynamic force it takes to pull the leading edge of a rubber-band-attached wing away from the plane, and he tells fliers how to determine some of the differences between improper "rubber-banding" and actual trim problems while a plane is in flight. Ken also reports on some of the less-than-peak flying performances of several members—all in good fun, of course!

Tom Crowley advises builders in "Tom's Tips," and there's a monthly photo gallery. Aran Hanpachern's plan to build a .25-size Ultimate Bipe (and to share his plans and building tips with the rest of the club!) is also interesting. The club's newsletter accurately reflects the club's members—first-rate!

For their positive attitude and membership involvement, we're sending two free *Model Airplane News* subscriptions to our newest "Club of the Month." Enjoy!

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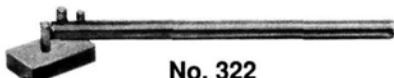
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# WIRE BENDERS



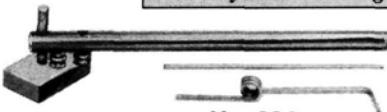
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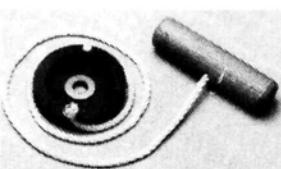
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## AIRWAVES

(Continued from page 119)

with a 4-channel radio. Two channels would be enough if you were building Model Airplane News' 1/2A version (plan no. FSP01901), but a larger platform rudder and a throttle should be included. As for a reasonably priced radio, either Futaba's Conquest 4 or Hobby Dynamics' JR Max 4 should do the job. Good luck!

GY

## DESERT STORM THANKS

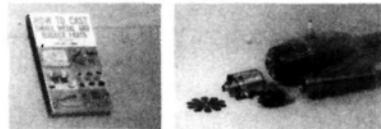
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JOHN R. MARSHALL  
COLONEL, USAF  
Alexandria, VA

(Continued on page 127)

## JET ENGINES AND TECHNOLOGY



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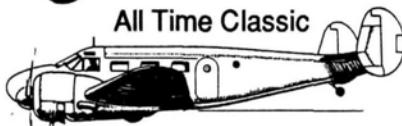
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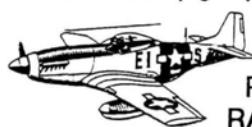
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# AIRWAVES

(Continued from page 126)

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CHAPMAN B. COX  
PRESIDENT, USO  
Washington, DC

*Colonel Marshall and Mr. Cox, you're very welcome. We at Air Age Publishing were pleased that you accepted our donation at a time when your organizations were busy supporting our troops. (Air Age donated more than 110,000 back issues, most of them *Model Airplane News*.)*

TA

## LOCKHEED LOVER

In your April column, you showed a picture of Tom Sewell's scratch-built Lockheed T-33. I'm interested in building one of these, and I'd appreciate it if you could give me a plan source for this subject, or forward my name to Mr. Sewell in the hope that he may supply the plans. Thank you very much.

ROBERT S. OTT  
Dublin, PA

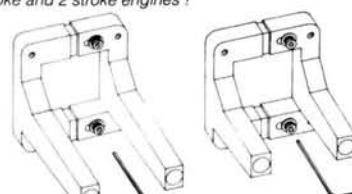
*Robert, no plans are available of Tom Sewell's T-33 at this time, but there's a kit of reported high quality that's available from Leading Edge Models. This kit has very good glass work, and I've witnessed its flight performance, which is also very*

(Continued on page 128)

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## AIRWAVES

(Continued from page 127)

good. It's the only kit of the T-33 of which I'm aware. If you're interested in this new company, contact Leading Edge Models, 170 Oval Dr., Central Islip, NY 11722, or call (516) 234-7264.

CC

## DREAMS WITH WINGS

I'm a 13-year-old dreamer about R/C aircraft. For two years, I've been going to the library every month to read *Model Airplane News*. I love it!

I've built a few rubber-powered airplanes, and I have a Cox 1/2A powered control-line plane. I hope to buy an R/C plane in the near future. What would be a suitable 1/2A trainer?—the Cox Cadet 3?

JORDAN BAKKER  
Chatham, Ontario, Canada.

Jordan, thanks for the kind words about the magazine. The library is a great place in which to dream. Cox 1/2A-powered model airplanes (both R/C and U-control) have been the starting point for hundreds of thousands of people entering the hobby, so there's little doubt about their popularity. For trainers, two manufacturers come to mind: Airtronics offers

(Continued on page 141)

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RACK VIEW

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# JET BLAST

## JPO; SOURCES; BUILD A HATCH

by GEORGE LEU

**R**ALPH BAILEY\* of Orangeburg, SC, has told me about the Jet Pilot's Organization (JPO), which he currently heads. This organization is working to obtain special interest group status from the AMA. When you think about the amount of time, energy and money we've all invested in our jet models, an organization representing our interests to the AMA seems like a fine idea.

### BOB VIOLETT MODELS

I first read about Bob Violett when he was involved with World Championship Pylon Racing. I first met him after a demonstration of the first R/C ducted-fan airplane, the Sundowner. Over the years, I've come to admire Bob's skills as both a modeler and as a manufacturer of fine jet model kits.

Recently, I heard a group of model-jet fliers talk about BVM merchandise as "super-fast, high-

performance oriented and high priced." A glance at the BVM catalogue might have left them with that impression, but there's more to the story.

The high-speed, high-performance image is propagated by BVM demonstration pilots when they perform at air shows or special events. The "wow" factor is directly related to speed, and speed is definitely a way to get the crowd involved during a flying demonstration. The pilots demonstrate the planes' performance abilities by sending them almost out of sight and then having them dive for the ground. Along the way, they usually complete a dozen maneuvers.

When I see that type of flight demonstration, I consider what they're try-

ing to prove. Many of you remember that early ducted-fan flying wasn't trouble-free. Many early aircraft lacked the power for vertical maneuvers and were very slow to accelerate. They were



Here's Bob Boswell's Yellow Aircraft A-4 Skyhawk. The plane weighs 10 pounds, ready to fly; it has an O.S. .91 engine, a Dynamax fan and Rhom-Air retracts.



A close-up of the A-4 Skyhawk's cockpit.

heavier than their builders would have liked them to be, and often not structurally sound enough to take mild abuse.

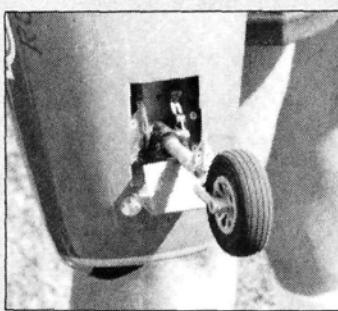
In the past few years, BVM has been a leader among the manufacturers that have changed all that. The engineering of materi-

als and designs increases the price, granted, but if your time is scarce and you're willing to spend a few dollars, I would argue that the high degree of prefabrication and engineering in a BVM product can outweigh any price disadvantage.

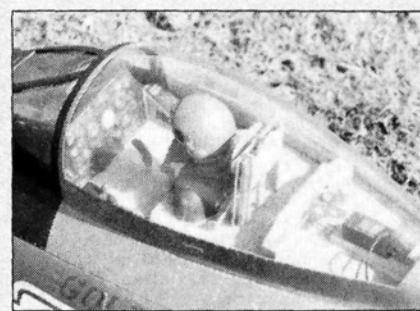
At Top Gun '91, five BVM Sabre Jets were entered in individual competition and one in Team Scale. They all scored very well in Static and Flying, and they finished 2nd, 3rd



Bill Harris's BVM Sabre jet at Top Gun '91. This all-stock kit weighs 12.5 pounds and is powered by a KBV .82.



Bill's typically high level of craftsmanship is evident in the construction of the Sabre's nose gear.



Notice the intricate details in cockpit area of Harris's Sabre.

and 8th in the individual competition and third in Team Scale. My favorite F-86 miniature was flown by Bill Harris and was modeled after the Canadian aerobatic team's Golden Hawks Sabre Jet. Bill used acrylic lacquer to finish his superb plane.

BVM publishes a quarterly newsletter called "The Inlet." In addition to information on BVM products, this booklet covers a wide variety of topics, and I heartily recommend a subscription for all ducted-fan enthusiasts.

### MAKE YOUR HATCH LATCH

In a ducted-fan model, the engine and fan take up a lot of space, and you may often find yourself looking for nooks or crannies in which to mount the servos. Once you've installed the servos, you may wonder how you'll be able to service them later on. A fuse hatch is the answer. The hatch can be cut from the fuselage wall. I usually make my own fuselage hatch latches even though there are some commercially available. My method is simple, and I'd like to pass it on to you.

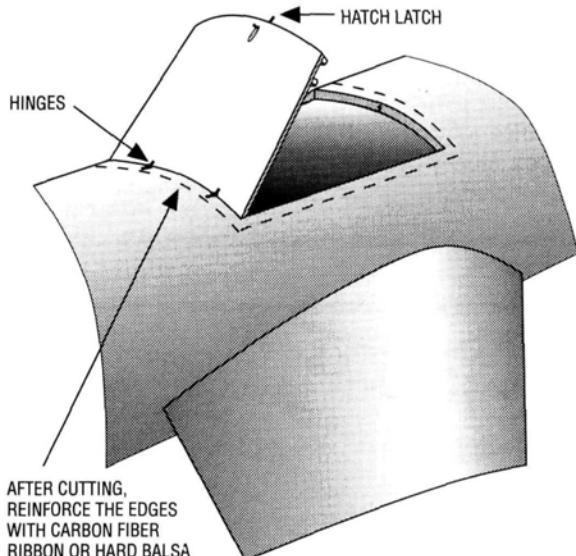
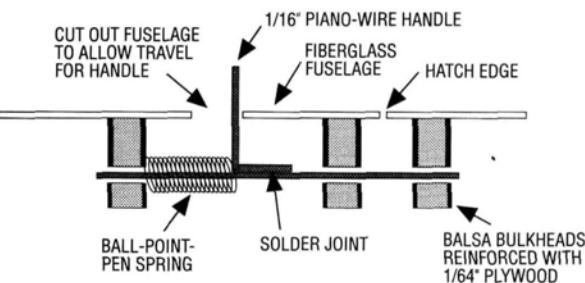
I start by soldering an L-shaped piece of  $\frac{1}{16}$ -inch piano wire to a straight piece of 2-inch long piano

wire. The L-shaped piece will be the handle that protrudes from the fuselage. It can be trimmed to any height after it has been installed.

Then I cut three balsa bulkheads to contour with the fuselage area where the hatch has been cut (see illustration). I reinforce the balsa with  $\frac{1}{64}$ -inch plywood. I also drill  $\frac{1}{16}$ -inch holes in the bulkheads through which the straight piano wire will travel.

Once a cut has been made and the hatch removed, it's a good idea to reinforce the edges adjacent to the bulkhead formers with  $\frac{1}{4} \times .007$  carbon fiber ribbon (see illustration);  $\frac{3}{16}$ -inch-square or  $\frac{1}{4}$ -inch-square hard balsa wood can also be used. This reinforcement will prevent the fiberglass edge from warping, which can happen as a result of stress brought on by the cutting. I make a thin slot in the hatch for the latch handle and slip a ball-point-pen spring onto one end of the straight piano wire so that the spring's compression will keep the pin in its place, locking the hatch. I then add the bulkheads

### HATCH-LATCH MECHANISM (SIDE VIEW)



AFTER CUTTING,  
REINFORCE THE EDGES  
WITH CARBON FIBER  
RIBBON OR HARD BALSA  
( $\frac{1}{4}$  sq. or  $\frac{3}{16}$  sq.)

and glue it all into the fuselage at the appropriate location with CA (see diagram).

### MIGHTY LITE PLYWOOD

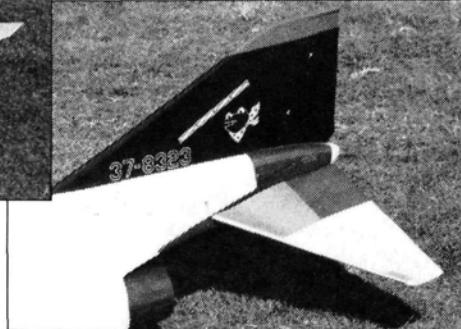
**M**ighty Lite is a premium-grade plywood that's now available

in the U.S. exclusively through Frank Tiano Enterprises and House of Balsa. It has many advantages over the plywood typically available here.

Mighty Lite offers a beautiful, smooth-grain finish and a lamination process that resists splintering, warping and flaking. This premium-grade 3-ply wood is far lighter than 5-ply woods, yet it's just as

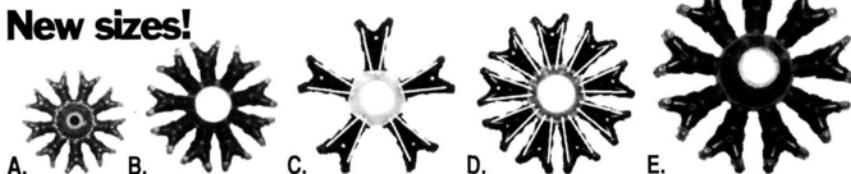


Steve Slachta's Yellow Aircraft F4E is dressed up with Aerolift markings.



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## AEROLIFT DESIGNS

Have you ever decided against doing a project because its paint scheme was too intricate? Well, Steve Slachta may help you make your project happen. Steve is president of Aerolift\*, which manufactures precise, dry-transfer decals. These markings and graphics can be made for any scheme, or they may already be available from his large catalogue. I was very impressed with his "Amigo" version of the Yellow Aircraft F-4 Phantom at Top Gun '91. Black-and-white prints don't do the color scheme justice; it sure is attractive.

## THE NEXT TOP GUN?

The Yellow Aircraft\* A-4 Skyhawk really flies well. A lot of it is prefabricated, and it's a common sight at jet rallies in the Northeast. It's seldom modeled as a scale project, so I was very surprised when Bob Boswell gave me a call and asked if he could show me his.

I've never been as impressed with a modeling project as I was with Bob's new jet. It's as highly detailed as any aircraft competing in Top Gun or the Scale Masters Program. Bob's highly detailed version of the rather plain kit has opened my eyes to this aircraft's scale potential. My hat is off to Bob for this project.

\*Here are the addresses that are pertinent to this article:

Ralph Bailey, 3088 Bragg Blvd. NW, Orangeburg, SC 29115; (803) 534-8300.  
Bob Violett Models, 1373 Citrus Rd., Winter Spring, FL 32708.

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# GOLDEN AGE

## OF RADIO CONTROL

by HAL DEBOLT

### Your forum! Selinsgrove '91

LL LET YOU do most of the talking this month. It's always good to hear from readers who are interested in the "Golden Age" and have tales to tell. Everyone agrees that they were great times!

George Pearce\* of Chesapeake, VA, says we met when he lived in Syracuse, NY—a very active area and almost in my backyard. We must have shared an interest in free-flight, and that's much longer ago than I'd care to admit! George's first R/C was a Live Wire (LW) Trainer powered by a Mills diesel engine—with rudder



Brian Mercer of Perth, Australia, has this fine collection of OT radios.

only, of course (same combo as the original). The Mills fit the Trainer well and displayed a most useful trait: it turned all 9-inch props—no matter what their pitch—at the same rpm! This was very handy

for test-flying. A 9x4 prop gave a relatively slow, safe speed for initial flights, and a 9x6 enlivened the Trainer and gave it enough power for the best performance.

George developed an early 3-channel receiver that was the subject of a *Model Airplane News* construction article. (Yes, magazines did tell us how to build radios as well as planes!) The reliable "Pearce receiver" used a combination of reeds, tubes and transistors, and George used it in his LW Champ at an early Selinsgrove meet.

### ANY TAURUS TAKERS?

NOW THE BEST OF all: George read the recent "Golden Age" discussion of the Taurus and remembered the "like-new" Taurus that has been stored in his attic since he last flew it in 1970. He's now interested in R/C gliders and electric power. (Mini electrics are popular in the D.C. area where he now lives). He isn't interested in pattern flying or in the Taurus, and he's willing to donate it to someone who's interested in flying vintage R/C airplanes. It's powered by a slightly used S.T. 60, for which he'd like a reasonable price, and the lucky recipient must arrange for transportation. How about that? If you're interested, write to George;

his address is given at the end of this article.

### DOWN-UNDER DISPLAY

Brian Mercer\* of Perth, Australia, built his first Orion in '61 (it had an O.S. 8-channel reed system) and, to celebrate his more

### SHOOTIN' THE BREEZE 'BOUT BABCOCK...

Y DISCUSSION OF Babcock Models brought additional information from Francis Iacobellis of New York City. Francis is an avid collector of OT model kits, and he also has other



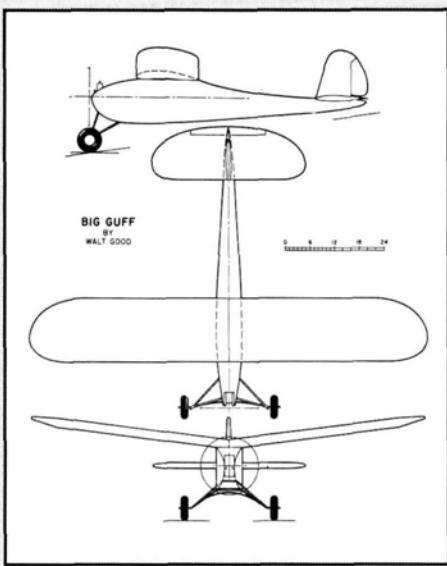
The progression of R/C! Left to right: a Bramco 5-channel reed transmitter with its separate "stick box." (It also had a 9-foot attached antenna!); the Orbit, analog, four-control proportional; a 6 channel Pro-Line with its integral antenna. (It had dual rates—first of the moderns?)

than 30 years in R/C, he's now building another one. He also has an excellent comprehensive collection of radios that includes early and recent systems and includes some rare specimens. He spreads the R/C word by displaying them whenever he can—contests, air shows, etc. If you have any suitable bits and pieces you'd like to part with, please get in touch with Brian. (His address is at the end.) He loves to talk about old times.

equipment—more than 450 items. He seems to have every LW kit and the entire Babcock line, and his letter fills in some of the gaps in our knowledge.

Babcock ads offered a kit of the Breezy—a 42-inch-span plane for .049 engines. The ads said it was perfect for R/C yet stable enough for free flight! It's interesting to note that these early R/C kits were advertised for use with all three phases—free flight, control line and R/C. (Manufacturers obvi-

# '91 SELINGROVE SUGGESTIONS



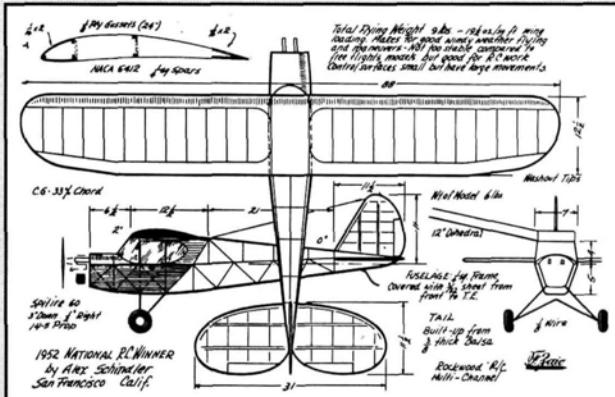
A three-view of the Big Guff.

to take part this year. What could you fly? What would fit the event's theme perfectly and be most unusual? Here are three likely candidates:

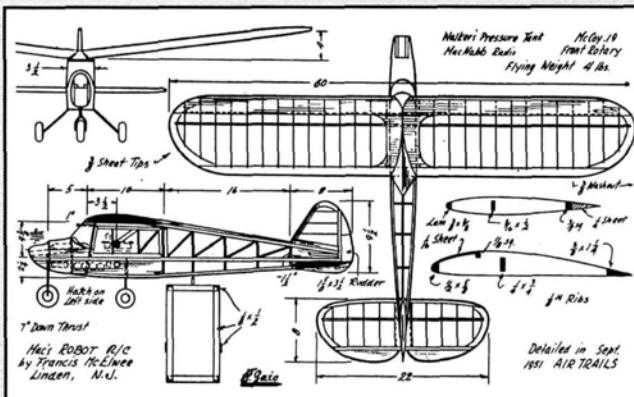
**• The Good Bros. Big Guff.** It would be difficult to go back much further than this one, and it must be the best-known of the "first" R/C airplanes. Basically a converted free-fighter, this big model was initially flown with rudder only. Controlled by Good's own radio, it was powered by a Brown Jr. engine that gave it a slow, majestic flight per-

formance. Elevator control was added later.

**• Alex Schindler's Big Cub.** Perhaps you'd like the best of two worlds—a true old-timer with multi controls. The Big Cub was probably the earliest multi design, as it was flying in 1950 when most of us were still struggling with single-channel systems. It has



Here's a Schindler Cub three-view.



A three-view of the McElwee Robot.

ously wanted all the sales they could get!)

Designed by Chuck Hollinger, the Breezy Sr. was a 56-inch-span version for Goodyear Pylon Races (now Formula I) and aerobatics. It used .09 to .23 engines, and the plans showed full controls plus brakes. Both Breezy kits had the usual wooden

structure, but the Sr. had plastic parts like those we see today—cowling, wheel pants, wing tips and even rudder fairing. (Is nothing ever really new?)

Speaking of the Goodyear Racing event reminds me that R/C pylon racing has an interesting history. It progressed from a stark beginning in rudder-

several consecutive Nats wins to its credit. The original had a 7 1/2-foot wingspan, weighed 9 pounds and was powered by an Anderson .60. Controlled by an early Rockwood 5-channel reed system, it could do everything except fly inverted.

**• Fran McElwee's Robot.** Mac was a perennial at Selinsgrove. A prolific model designer, others often flew his creations, and the good-looking Robot was one of the most popular. It was of moderate size (60-inch wingspan) and light (4 pounds), and it was powered by a McCoy .19 that was fed by a Walker pressure system. A MacNabb 465 single-channel radio provided reliable control. Robots seemed to be airborne continually at the early meetings. If you'd like a neat-looking Selinsgrove veteran, the Robot could be the one for you.

Following the success of the '90 Selinsgrove meet, the VR/CS expects the second one to be considerably larger, and it will certainly be the place to see how things used to be.

only days to what is now probably R/C's best duplication of full-scale competition and to a world championship level. Again, I could use help. I know that Jerry Nelson did a great job of promoting Goodyear racing as the groundwork for Formula I, but I haven't heard from Jerry or any others who might have info

and photos. Can anyone help?

Babcock made a concerted effort to introduce R/C to non-modelers. They started with a couple of ready-formed plastic boats (a trawler and a yacht, both nearly 3 feet long), and they followed them with a scale 37-inch-span Tri-Pacer,

(Continued on page 138)

## GOLDEN AGE

(Continued from page 137)

which was apparently made entirely of formed plastic. The advertising "hype" touted "no more assembly, covering, alignment, or painting." Buy it today; fly it tomorrow! Sound familiar?—this was the '50s! The price?—\$9.95 retail!

The single-channel Magic Wand transmitter and the Magic Carpet receiver on the CB band (using tubes) completed Babcock's offerings. Later, the company introduced a completely transistorized receiver. It was slightly difficult to understand why, because it was a super-regen, and super-hets had already solved many of our problems. I mentioned a Babcock 465 system, and Francis Iacobellis says it was a 2-channel, tone-modulated type—the leading edge of technology at that time. I wonder why it wasn't well accepted.

Frances would like to add to his collection, so if you have something that might be of interest, look for his address at the end of this article.

### TORKS' TOC!

O.B. Ramsey of Norman, OK, brings up a subject that needs clarification. He notes the wide attention paid by the media to the Tournament of Champions, and he comments on a statement he heard about the TOC having originated in Las Vegas in about 1974. He says there was a TOC way before that—in Oklahoma City; and it was sponsored by the Torks

R/C club. This information certainly rang a bell with me, because I've attended both events. With O.B.'s help, I'll fill you in on those early contests.

First, the Torks' TOC: Maurice Woods owned the

pattern and Goodyear racing was there, and we all enjoyed every minute. As well as great flying, we had an entire amusement park at our disposal! I best remember the Go-Carts and how they really "flew" with



Here's Vernon Bartlett of Norwood, NY, in '59 with his original R/C design. The Norwood R/C Ground Pounders have their best flying off the snow and ice of Norwood Lake.

Wedgewood Amusement Park on the outskirts of Oklahoma City, and as an R/Cer and Torks member, he initiated the TOC events. In 1963, the first one was a qualification meet for the '64 FAI World Champs. Held at Cimarron Airport, which was adjacent to Maurice's amusement park, they somehow managed to entice many top fliers to attend—surely, a Tournament of Champions. Attention given to it by the media benefitted the meets that followed.

I had the pleasure of attending the '66 Torks TOC as Maurice's guest. The meet had gained a considerable reputation by then; anyone who was anyone in

those hot-rod pilots at the sticks! The FAI Team emerged, too: Kraft, Weirick and Spreng. Also, for the first time, there was a major pylon race—one that established Jerry Nelson's idea for the event as a viable one. I've looked at O.B.'s pictures of the planes, and it seems that none would look strange at the field today.

Does anyone have any ideas why the Torks TOC was discontinued?

### SECOND TIME AROUND

The TOC idea apparently languished until the '70s when Walt Schroder of *Model Airplane News* decided the idea was too

good to waste. His friendship with R/Cer Bill Bennett of the Mint Hotel, Las Vegas, NV, ensured the necessary major sponsorship. The new competition resembled the original, but entry was by invitation only and limited to the world's top 20. I think the contestants' expenses were covered, but the prize money was modest by today's standards.

Did Hanno Prettner win this first Vegas TOC, too? I think so. The flying site was first-class—especially prepared at what the Mint Hotel called its "oasis" in the desert. I remember one of the best pylon fliers crashing, sticking the bits and pieces back together and wrapping the whole mess with duct tape. Yes, he did get another heat out of it! I also remember finishing my last pylon heat, cutting the engine far out over the desert for a landing approach and having my radio quit. We searched those sand dunes for over an hour before finding my plane stuck in one!

We once had meets like the Plymouth Internats, the Mirror Flying Fair, the Philly Copy and the Junior Birdmen, but the TOC is the last of the really major ones. Long may it continue!

\*Here are the addresses that are pertinent to this article:

**George Pearce**, 3232 Pineridge Dr., Chesapeake, VA 23321.

**Brian Mercer**, 108 Sultana Rd. West, High Wycombe 6057 Perth, Australia.

**Dr. Francis Iacobellis**, 153 East 88th St., New York, NY 10128. ■

## AIRWAVES

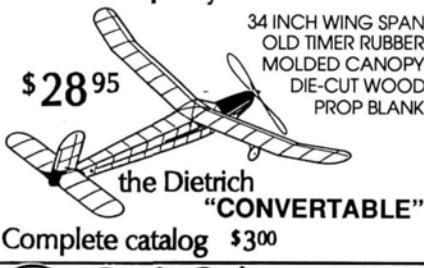
(Continued from page 128)

the tried-and-true Q-Tee, which is a nostalgic 36-inch-wingspan parasol that almost flies itself; Ace R/C markets several suitable 1/2A trainers and sport models. Look for Ace's High MKII (a powered glider), and the Wizard and the Alpha, which are both 40-inch-span high-wing cabin models. Two more advanced models from Ace are the Mach None and the Pacer—both 1/2A pattern models, which aren't for beginners but are great for sport flying. Try them when you've built two or three trainers and are comfortable flying solo. The Cox Cadet 3 is a good, general-purpose radio that's perfect for your need—as long as it comes with miniservos and a 250 to 450mAh receiver battery pack to save on weight. A newer Cox radio—the Cobra 3—is described in this month's "Product News." Why not check it out? Remember, some dreams do come true!

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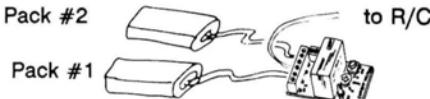
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